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CROSS-COUNTRY SKIING

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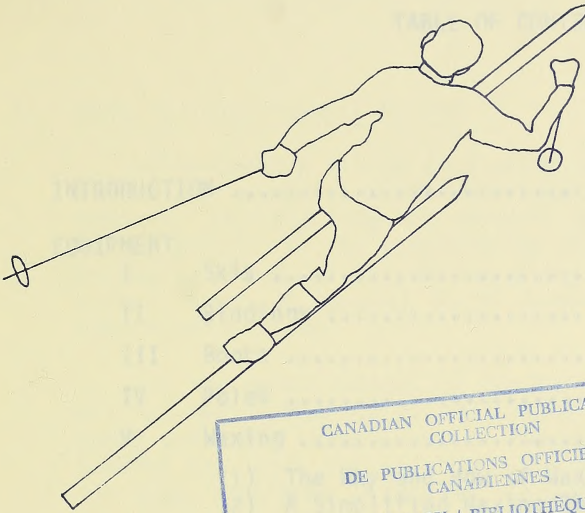

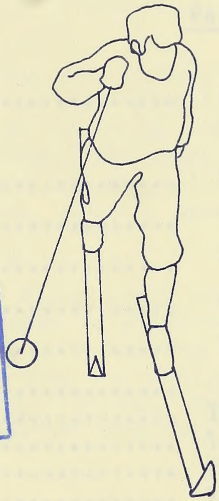

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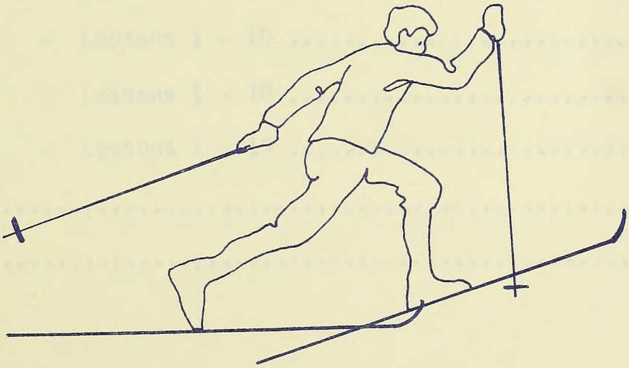
CROSS-COUNTRY SKIING



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INTRODUCTION

I. What is Cross-Country Skiing?

Cross-country skiing originated many centuries ago in Northern Europe as a means of transportation. Late in the nineteenth century, the practice of holding ski races as sporting events became popular in the Scandinavian countries. Today, the sport has become an event in the Winter Olympic Games and is the national winter sport of several North European nations, notably Norway, Sweden and Finland.

All the major nations of Europe and several Asian countries as well as the United States and Canada now send teams to the Olympic Games and World Championships. Competition however is not the only benefit the sport has to offer. To millions of "touring" skiers of all ages it offers a healthy outdoor recreation. Indeed, one of the greatest virtues of the sport is the lifetime of participation in which the skier may anticipate.

II. Why Cross-Country Skiing in our Schools?

1. It is the purpose of the Federal Government to encourage better physical fitness for all Canadians.

2. We should emphasize lifetime or carry-over activities which will provide insight and motivation for a lifetime of vigorous physical activity.

3. Cross-Country Skiing is an activity which is adaptive to all ages from 3 - 95.

4. Vast areas of the Canadian countryside are eminently suitable and available for ski-touring.

5. The initial outlay for equipment is very modest.

6. Ski-touring is very enjoyable.

EQUIPMENT AND CLOTHING

EQUIPMENT

Today's cross-country skis can be divided into four distinct types; racing, light touring, touring and mountaineering. True racing skis are very light, narrow, and have great stiffness intended only for use on prepared tracks and by those athletes with explosive kicks. The mountaineering ski on the other hand is the heaviest and widest of the cross-country variety. It most often has metal edges to provide control on the hard-packed or icy surfaces most often encountered during uphill or downhill traversing.

General touring, however, is divided into light touring and touring. Most beginners and recreational skiers should choose the light touring ski for use on poor trails and occasionally off-trail. The touring ski is a wider, heavier ski and is recommended for a lot of off-trail "bushwacking", skiing in deep snow. This type of ski is especially good for the winter camper who will spend a lot of time breaking trail with a pack on his back.

The cross-country ski which is most applicable to an elementary school setting is the light touring ski because 90% of the time instruction will take place on prepared tracks.

I. SKIS

The growth and popularity of cross-country ski touring has given rise to an increase in the variety of equipment from which the skier may choose. Not many years ago, only wood skis were recommended. Wood skis are being used but they are far outnumbered by the fiberglass models.

Fiberglass skis have features known as "cosmetics". Some look gaudy, many are handsome, and a few are classy. The first fiberglass skis appeared in 1974 and since then an incredible amount of research and development has taken place in ski manufacturing. The reason for the popularity of fiberglass skis is simple. They are better to ski on. They have more pep, glide longer with each stride and are far stronger yet are lighter in weight.

All skis are built around a core. Wood is still used as a core material, but more often various forms of synthetic foam are also used, polyurethane and acrylic foams being the most satisfactory. These materials are dense and strong, yet light, and make it possible to achieve repeatable camber from ski to ski.

The most common method of construction is a sandwich in which the various layers of the ski are stacked in a mold and then bonded together with heat and pressure. Refinements of the sandwich to give a ski added strength may involve wrapping the core completely in glass before it is sandwiched into the ski. After the ski has been molded, exterior finishing coats are applied to protect its inner workings from moisture and abrasion. Phenolic, polyurethane and ABS are frequently used.

Nordic skis are side-cambered to aid tracking. They have extremely soft tips and slightly harder tails. This combination of tensions allows a ski tip to follow small terrain variations while giving the ski a forward spring characteristic.

The camber is the amount of arc in the ski. The degree of resistance to flattening of the camber is called flex. Camber and total ski stiffness should be selected to match a skier's weight and touring style. Camber distributes the skier's weight evenly onto the snow over the entire waxed surface of the ski. Too little camber will cause too much weight to fall directly under the skier's feet thus offering resistance to the glide. Too much camber would prevent the skier from getting a good grip on the snow, making climbing very difficult and causing slippage.

Choosing the proper camber is sometimes difficult. The easiest test is the paper test. Place the skis on a smooth, hard floor surface and stand in the correct place on each ski with weight equally distributed. Have someone try to slide a piece of paper under the "wax pocket" - the part of the camber near the center that is the last to flatten under weight. If the paper won't go in, the ski is too soft. If the paper slides just under the skis, then the ski camber is just about right.

In determining the length of your skis, the general rule to follow is that the ski should reach the wrist of the upstretched arm unless:

1) You are a child age six or less.
2) You are big boned and hefty for your height - then 5 cm longer.
3) You are very light for your height - then 5 cm shorter.

II. BINDINGS

Due to the greater movement required of Nordic techniques as opposed to that of Alpine, the heel must be free to life off the ski. Nordic ski bindings, therefore, allow for maximum freedom of foot movement and good ski control. Two basic types have been developed which are the toe clamp binding and the cable around heel binding.

a) Toe Clamp Binding:

The "Rotterfella" binding has 3 or 4 pegs projecting up and mating with corresponding holes in the boot. A clamp pivoting at the binding sides is pushed forward and pressed against the square toe and is maintained in positioned by the locating pegs.

The "Kloa" uses the rolled-in binding sides or ears to hold down the boot and two spike-like clamps are pushed through grommented or eyeletted holes in the square toe. The clamps project through the welt and the bottom of the binding and do not allow the withdrawal of the boot.

The "Rotterfella" and "Kloa" bindings should only be used on light touring or racing skis since they are not strong enough for heavier skis or deep crusted snow conditions.

When mounting, the center balance point has to be found by placing the ski on a firmly held pencil and adjusting accordingly. A squared pencil line across the top should be in line with the other ski similarly balanced. The binding is then mounted so that the toe of the boots uppers will be in line with the balance point. When the ski is held by the center of the binding ears, the tip will dip down about 20 degrees. It is worthwhile marking all screw holes but only drilling for one or two to check accurate balance. If all is correct, then finish the job; if not, plug the holes with glued wood and start again.

b) Cable Around Heel Bindings:

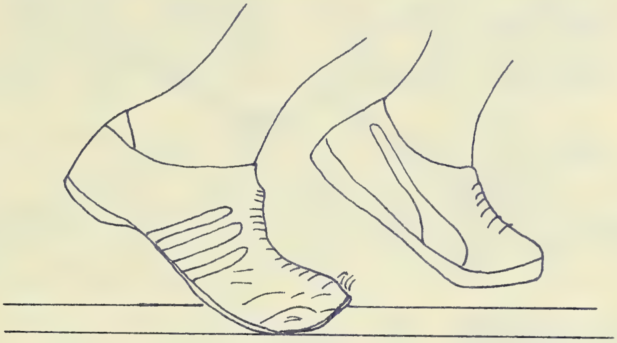
These models have a simple toe iron with cables or a threaded bar going back to the heel. Those which have a cable have a curved spring which fits into the heel groove, and a clamp in front of the toe iron pulls the cable and hence the boot tightly in the toe iron. The spring length can be adjusted with a knurled brass screw on the clamping mechanism so that they can pass under hoods screwed to the ski side and so keep the heel locked down for Alpine ski technique.

The other model on the market has two lightweight steel cable bands hinged on the toe iron ears. They extend back to the ratchet type heel clamp. The cables are threaded and can be screwed in or out for length and adjustment. Cable bindings are mounted in the same manner as for light touring skis.

Heel plates are nailed to the ski to prevent snow balling up underneath the heel, and they also provide lateral rigidity when the arch of the heel is pushed out such as in a snow plow. Snow may also ball up beneath the arch of the foot over the ski and this can be eliminated by tacking a bent-over section of bicycle inner tube and allowing it a springiness which casts off snow.

The relatively flexible connection between boots and binding, combined with the freedom of the lift-off heel helps prevent accidents from occurring when Alpine skiing.

Bindings require little maintenance but one should check for faults before touring. Check the screws to see they are holding firmly. If not, unscrew and force glued wood into the screw hole and cut off level with the ski surface. Let dry for a few hours and screw down but leave a final twist for 24 hours later which will then lock the binding firmly.



Ski touring boots in bindings are equally as flexible as tennis or jogging shoes.

III. BOOTS

Generally, cross-country ski boots have to be light, sturdy and have flexibility in the soles.

The racing boot is cut below the ankle and resembles an ordinary shoe. Soft and pliable leathers such as goat or kangaroo are used for the uppers to make the boot as supple as possible. It has a laminated leather or leather rubber sole which is designed to be flexible under the ball of the foot while simultaneously being strong to withstand side twist. The boot sole is narrow so that the boot will not drag unduly against the snow edges of cross-country ski tracks. This light cross-country ski boot may not be warm enough in extremely cold weather so a nylon pullover sack may be necessary to add insulation and provide water repellency.

Light touring boots resemble the racing boots in shape and size, however, stronger leather is used in the uppers. They have thicker laminated leather or composition soles and are cut higher (above the ankle). Most light touring boots have a cable groove milled into the heel so that they can be used with general touring bindings.

Touring or general touring boots are similar to hiking or mountain climbing boots, being semi-padded with a water tight double tongue. The soles are usually made of laminated leather topped by a textured rubber running from toe to heel. Metal plates are attached to the upper edges of the welt to prevent wear and tear when the toe moves in the toe binding iron. There is a milled groove on the heel rubber for binding cables.

When choosing the size of boot always wear a heavy pair of socks over your regular socks. The boot that fits well feels snug over the instep and around the heel but has plenty of toe room.

A well chosen pair of boots will last a long time if cared for properly. After skiing, brush off the snow, stuff the boots with newspaper and place in a well ventilated, warm environment, away from direct heat. When they are are thoroughly dry, remove the newspaper and store in a cool dry place using boot trees to help maintain shape.

The leather exterior should be treated regularly with a good wax polish to assist in repelling moisture. Oil and grease preparations will deteriorate the leather and stitching. The welt should receive particular attention and a good silicone compound should be worked into the cracks and crevices.

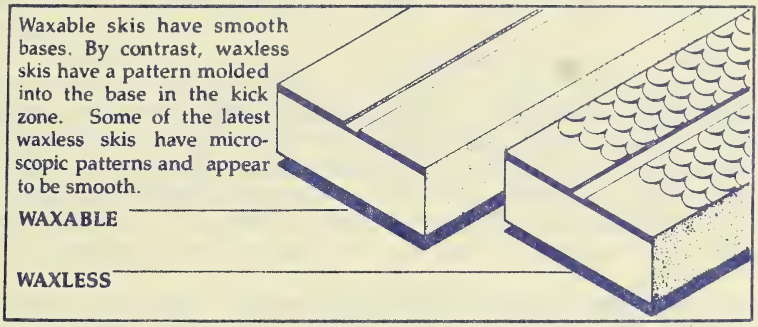
IV. POLES

Nordic poles should be springy to give a little whip which helps push the skier forward much as does the forward spring of Nordic skis. Traditionally, Nordic poles have been made of treated bamboo, to achieve the desired combination of strength, light weight, and liveliness. In the last few years, fiberglass and metal poles have been developed that have these characteristics.

Most pole baskets have a plastic or metal ring fixed to the pole shaft by a plastic or rubber web. The wrist loops must be adjustable so that the pole swings freely from the hand without danger of being lost. The grips have a tapered elliptical cross-section to fit the various hand positions used in touring. In contrast to the straight tips of Alpine poles, the tips of Nordic poles are set at an angle to the pole shaft. This is because the poles are rarely set with a forward-swinging arm. The forward-angling pole tips snag on the snow surface to help pole setting and ease pole withdrawal from hard snow.

The correct pole length can be selected by standing with feet together on a flat floor, with the pole vertical and the tip on the floor at one's side. The pole grip should fit snugly under the armpit: a 175 cm skier will use poles that are approximately 135 cm long. The baskets on cross-country racing poles are usually about 9 cm in diameter, a size suitable for use on packed cross-country racing tracks. The baskets on touring poles are larger, about 11.5 cm in diameter, so that the poles do not sink into deep snow.

V. WAXING



Waxable skis have smooth bases. By contrast, waxless skis have a pattern molded into the base in the kick zone. Some of the latest waxless skis have microscopic patterns and appear to be smooth.

The motion of cross-country skiing, a rhythmic gliding on one foot and then the other, requires that your weighted ski stays put for a moment so that you can swing forward onto the other ski. Keeping the ski in place is achieved by one of two methods. By waxes applied to the running surface of the ski or by a pattern molded onto or cut onto the surface of the ski. Both methods have advantages.

The waxes used for cross-country skiing are complex formulations of wax (to give the ski its glide) and a sticky ingredient, chemically akin to the stickum on Scotch tape (for grip). It is this small amount of stickum that makes the ski stay put when weighted and allows the skier to ski uphill as well as on the level. There are many different waxes, each compounded for a particular type of snow condition. Learning to wax will ultimately provide the best performance from wood skis.

Start with a two-wax system using one for cold, dry snow and one for warmer wetter snow. Although racers who wish to optimize their skis' performance may carry around a large assortment of waxes, most tourers and recreational skiers get very good results with far fewer.

One great advantage of the waxless ski is that no time is spent preparing skis. Waxless skis work best when the air temperature is just at the freezing point and waxed skis are slipping or sticking. Waxless skis feel secure underfoot and they glide easily over needles and frozen leaves on the trail.

Why then continue to use waxable skis? A waxed ski glides better because the pattern on the bottom of a waxless ski is bound to create some resistance to gliding if the pattern is pronounced enough to grip firmly. When you put your weight on one ski to glide, the waxless ski slides to a stop more quickly. For a school program a ski's glide may not be as important and convenience may far outweigh any lack of performance.

Waxless skis are often a trouble free way to begin and possibly the best for young children.

1) The Why and How of Waxing

When confronted with a myriad of waxes, klisters, scrapers, corks, and torches, many new cross-country skiers are instantly overwhelmed. In many cases, waxing is presented as a mystical ritual that is messy and time-consuming. A lot of skiers naturally do the easiest thing and buy waxless skis. But with a little time and care, anyone can learn the basics of waxing. It needn't be a mystery.

On a properly waxed cross-country ski, snow crystals will dig into the wax when downward pressure is applied to the ski. This provides kick. Once the ski is in motion, the wax smooths out and acts as a lubricant enabling the skier to glide across the snow.

If skis have sufficient kick, most uphills may be climbed without resorting to the herringbone or side step. It is important for a skier to wax for the snow conditions. Waxing tunes the skis to give the right amount of kick and glide needed. To many skiers, this tuning process is one of the pleasures of the sport.

There are many different types of waxes, just as there are different types of snow. For instance, when snow crystals are very cold and dry they are sharp. They grip and hold to a hard wax. As temperatures rise and moisture content increases, the crystals become too large and round to stick to a hard wax. Softer wax must then be applied for a good kick.

When skis are waxed for warmer temperatures than actually exist, snow sticks to the skis. If one errs in the opposite direction, the skis will slip when kicking forward.

There are several brands of wax on the market. The best known are Swix, Rex and Toko. Each line of kicker wax is color-coded similarly. Green is the hardest wax. Blue wax is softer. Red is softest. Purple wax is a mixture of blue and red and is used when red sticks on the trail and blue slips. Hard waxes come in short round sticks, like big crayons and work best in new snow.

Klisters are very soft, sticky waxes packaged in tubes. They are also color-coded to the temperatures and snow conditions in which they work best. Klisters work best in old snow, on icy tracks and in spring snow.

There are many kinds of waxes. The numbers that one is likely to use at any one time are considerably fewer. Once one becomes accustomed to temperature fluctuations, two tubes of wax will be adequate for most occasions.

For example where the snow is dry and the usual winter temperatures range from 0 - 12 degrees Celsius, green and blue waxes will be used most commonly.

On cold mornings wax with green, polishing a thin layer on the ski. Smooth with a cork. As the day gets warmer, a thicker layer of green should be applied leaving the wax tacky under the foot for a better kick. In the afternoon one might need to switch to blue, starting with a thin, polished layer and adding thicker layers as the temperature rises. On most days, one wax application will be sufficient.

Green wax conditions are the easiest in which to achieve maximum kick and glide. The most difficult waxing conditions occur when temperatures are near the melting point ($0^{o}C$). In this temperature range no wax skis seem preferable.

For mountain touring, cross-country skiers rely on a two-wax system -- one for dry and one for wet instead of constantly changing waxes to match the changing snow conditions. The wetter and warmer conditions get, the thicker the wet wax is applied. The colder and dryer the snow, the thinner the dry wax application. The simplicity of a two-wax system appeals to many beginners. It also appeals to skiers on trips where the snow conditions fluctuate and kick is more important than glide.

One of the basic principles of applying cross-country wax is to wax for colder conditions first. Then if more kick is required, add a softer wax. It's easy to apply a softer wax over a harder wax -- the reverse is usually not successful.

Wooden skis are usually waxed from tip to tail. A coat of pine tar is applied to the bases at least once every season. With fiberglass skis, a coat of hot wax is usually applied at the shop where the skis are sold. This is gliding wax, also used on Alpine skis. It is melted onto the ski and scraped smooth.

Cross-country waxes should be applied over this gliding wax in a short "kicker strip" under the foot. The length of this kicker strip can vary, extending several inches beyond the foot in both directions. It should usually extend a little farther toward the tip of the ski than it does toward the tail.

When wax is applied, care should be taken to keep it out of the center groove of the ski. Gliding friction will not smooth out the wax in the groove. Snow crystals will cling to wax there, and the skis will ice up.

The easiest way to remove wax from skis is with a torch. The torch should be equipped with a spreader that matches the width of the flame to the width of the ski. Lean the ski against a table, base up, and begin at the tip to warm the wax. Then wipe it off with a cloth.

Proceed in 60 cm progressions down the length of the ski, warming and then wiping wax until the ski is clean. This process also helps to season the ski base with a good smooth coat of base wax. Never hold the flame too long in one place, as too much heat will damage a ski.

Occasionally old wax should be removed from skis. Wax may be removed either with a wax remover solvent or scraped off with a metal scraper.

Ski technique has much to do with the way cross-country wax works. If the skis are not weighted, there is no kick. Without a kick, gliding forward is difficult.

2) A Simplified Waxing Chart

HARD WAXES

Consistency	Color	Snow Type	Temperature, (^{o}C)
Hardest	Light Green	Cold, dry	Below -18
Hard	Green	Dry, powdery, hard, old	-12 to -4
Less hard	Blue	Hardpack or frozen granular	-7 to 0
Softer	Red	Wet	0 to 5
Soft	Violet	Old	0 and up
Softest	Yellow	Cloggy, wet, new	0 and up
Wax binder	Orange	Helps hold wax better on hard, cold snow	

SPECIAL WAX

Consistency	Color	Use
Paraffin	Milky	Glider wax

3) Simplified Waxing

The waxing table is a guide to the best match of wax to snow and seems to indicate that a large assortment of waxes is necessary. Simplifications can be made if one is not a cross-country racer and can tolerate being a few seconds slower per kilometer or having to herringbone up the steeper hills. The use of one hard wax for dry snow, one soft wax for wet snow and one for transition conditions is adequate for most touring.

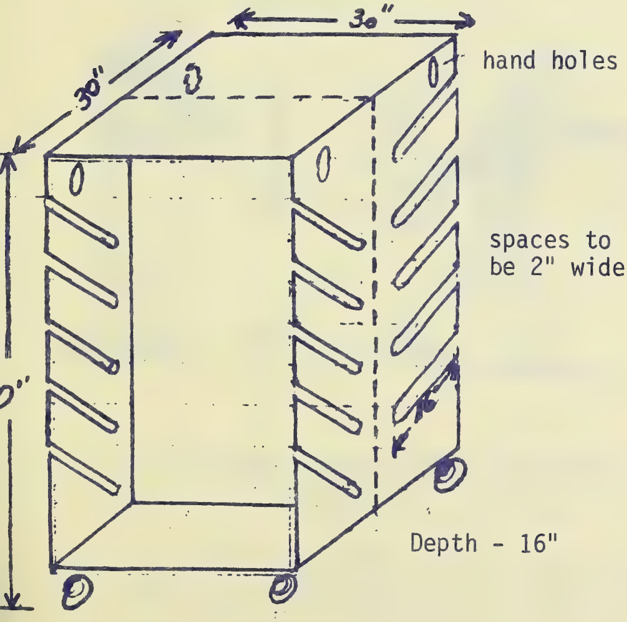
4) Storage and Maintenance of Skis

After use, cross-country skis should be brushed free of snow and placed in a cool room away from heat in order to prevent any delamination. They should be examined for any cracks or defects which might develop and repairs made accordingly. The binding screws should be tightened if loose and the binding examined for any structural defect.

The skis should also be cleaned of all wax prior to being stored for any extended period. Wax left on skis hardens with time and becomes difficult to remove.

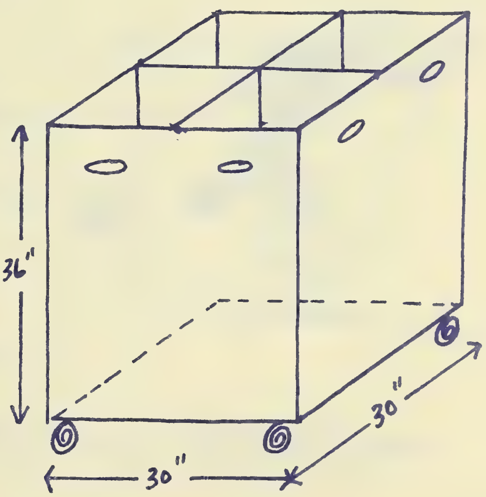
Skis should be stored in a cool dry place, preferably in constructed storage units.

Cross-country Ski Unit



All castors
to swivel

Cross-country Ski Pole Unit



Cover base with
rubber floor runner
or indoor outdoor
carpet

All castors to swivel

5) Sample Cross Country Ski Set (For an Elementary School)

a) Boots - 65 pair

Size	Quantity
10	1
11	1
12	1
13	2
1	5
2	5
3	7
4	7
5	5
5 1/2	5
6	8
7	5
7 1/2	2
8	5
9	1
9 1/2	1
10	1
11	1
12	1

b) Skis - 40 pair

Size	Quantity
150cm	7
160	12
170	10
180	6
190	2
200	2
210	1

c) Poles - 40 pair

Size	Quantity
90cm	5
100	10
110	10
115	5
120	5
130	4
135	1

d) Bindings - 45 pair

e) Wax

green - 30 tubes
blue - 30 tubes
glider - 30 tubes
Corks - 30
Scrapers - 30

When choosing a ski for your program you may choose a waxable or a waxless ski.

CLOTHING

The body works best with an internal temperature of 37°C and surface (skin) temperature of 33°C.

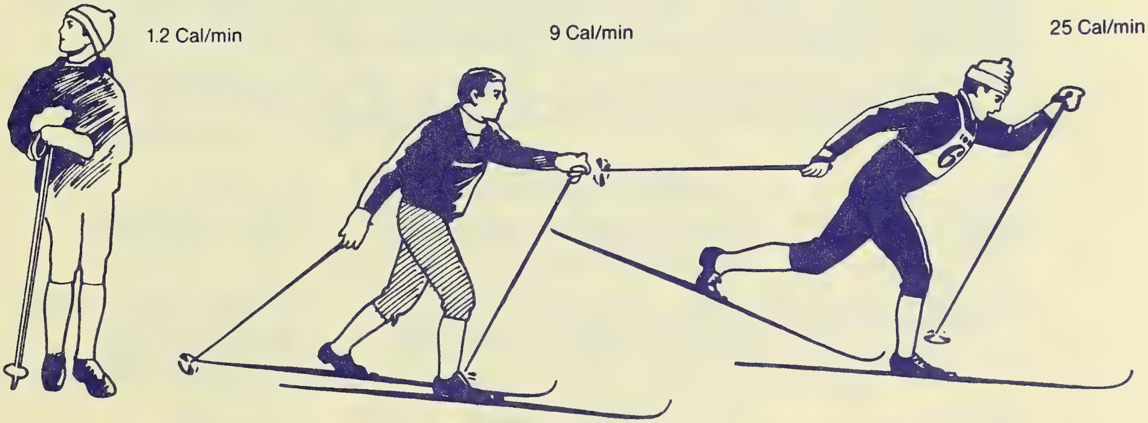
When at rest in temperatures lower than 27°C in air or 33°C in water the human body loses heat.

Clothing insulates and prevents heat loss. (Still air is a good insulator. Clothing actually insulates because of trapped still air in the fibers and not because of the fibers themselves.)

The body heat loss is greater the lower the outside air temperature, and increases very much if clothing next to the skin is moist or wet (water is an excellent heat conductor) or if the insulating ability of the clothing is reduced, as it may be in wind. (At 10 mph wind, air has only one-fifth the insulating ability of nearly still air.)

Conditions are seldom constant during a winter day. Temperature rises and falls, wind force and direction changes, sunshine varies in intensity and skiers activity varies.

A skier standing still produces at an average 1.2 kcal. per minute. When skiing, the average recreational cross-country skier produces around 9 kcal. per minute -- and the racer may produce up to 25 kcal. per minute.



The most common clothing error made by neophyte cross-country skiers is to underestimate the active nature of cross-country skiing.

Dress according to activity and weather. Stay flexible with the "Multiple Layer" principle. Several thin layers enable the skier to put on or take off clothes to vary total body insulation.

Inner Layer -- next to the skin -- functions mainly to keep the skin dry. Two methods are available:

1. Through absorption while presenting a dry surface to the skin. Wool absorbs up to 35% of its weight before it feels wet and therefore has long been a favorite underwear material.
2. Transporting perspiration outwards, away from the skin. The Super Underwear developed in Norway function extremely effectively in this manner.

Middle Layer -- functions mainly to insulate. The greater the insulation need, the more layers that should be used. Several thin layers insulate better than a single layer of the same total thickness, because more still air is trapped in and between thin layers.

Outer Layer -- has several functions. Primarily it protects against the environment, while permitting body heat to escape without trapping moisture. In other words the clothing must breathe. It also should allow the skier full freedom of movement. For less extreme weather conditions double-knit nylons or nylon-cotton tricots, preferably with linings and/or poplin fronts for wind protection, are more than adequate. Wind is the main hazard when cross-country skiing. Extra windproof outer clothing is a necessity.

Outer layers also have another very important function. They dictate the skier's appearance. Norwegians spend a considerable part of their leisure time skiing. Children -- youngsters -- men -- women -- meet on the trails. In Central Europe alpine and after-ski wear dictates fashion. In Norway standards are set on the cross-country ski trails.

Cross-country clothing should combine style and attractive appearance with a comfortable fit and full freedom of movement.

Sample Clothing Checklist

LAYER 1.............	Lifa or fish net underwear cotton socks	Cotton underwear
LAYER 2.............	Turtleneck shirt or wool shirt, knickers, knee socks	Flannel shirt, sweat pants or loose, stretchy pants
LAYER 3.............	Heavy sweater, Anorak leather or nylon outer mitts with wool inners touque, gaiters (see illustration below)	Ski jacket Bellaclava

Full length snow gaiters keep feet dry and make it possible to ski comfortably in any type of trouser.

TECHNIQUE OF CROSS-COUNTRY SKIING

I. FORWARD MOVEMENT

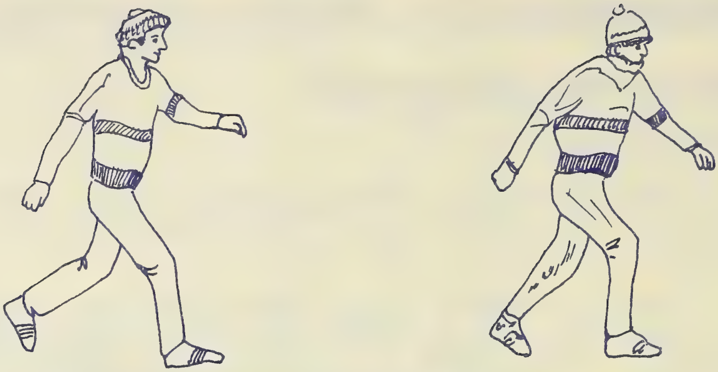
1. DIAGONAL STRIDE

The movements of cross-country or nordic touring are not difficult to learn, because its movements are an extension of something everyone can do - walk.

The basic term in touring technique is the "diagonal stride". It means that you use the opposite arm and leg together just like walking. The arm plants the pole while the opposite leg pushes off or "kicks". The diagonal stride can be best learned by starting with an ordinary walking stride on skis. The force of the walking kick is progressively increased, the upper body bends more forward, and the arms swing more to produce the correct diagonal stride. Just as in walking, the effect of the kick is to propel the skier forward. The pole helps in this maneuver, supplying from as little as a tenth up to a quarter of the energy to drive the skier forward.

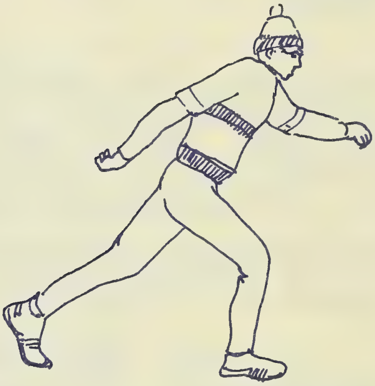
The mark of a skilled touring skier is a relaxed, easy stride, with rapid pushing movements, plus long glides with the weight balanced on one ski or the other. As in most other physical activities, the technique of the top competitors is the best technique: it is efficient, rhythmic, and natural. You should be able to tour using far less energy than in hiking over the same terrain. One of the best tricks is to relax the head and shoulders by focusing your eyes about 10 to 15 meters (about 40 feet) ahead of you; continual watching of your ski tips will result in a cramped and tiring position.

The diagonal stride uses the principles of ice and roller skating. In ice skating you glide on alternate skates and obtain forward drive by kicking off a weighted blade which is slightly angled to your direction of motion. In skating, the "kicking leg" swings backwards after the kick-off. The other leg gets the weight, and gives a push in its turn. The skating stride is then a kick-glide stride. To pick up speed in skating, side-to-side arm movements are added to counter- balance the kicking leg.



An ordinary walking stride can be done on skis.

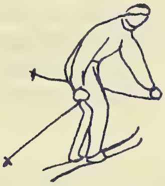
Leaning a bit more forward



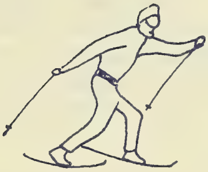
and kicking harder turns it into the diagonal ski stride.

If you are accustomed to Alpine skis, it may seem quite a mystery that the same ski surface can be used both to grip and then glide. The action of touring ski wax on snow is very much like a stiff brush on a wet boat deck. If you strapped brushes on your feet, you could kick off from one, and yet slide forward on the other. The basic principle applies to skis. A ski will glide as long as it is in motion. Once gliding stops, it will stick until it is picked up slightly so it can glide again.

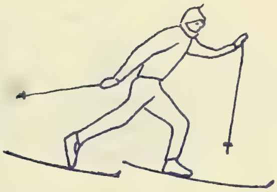
Diagonal Stride



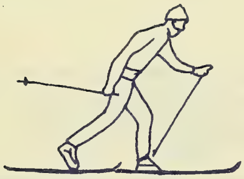
The right leg is even with the left, which is now weighted. With a slight, rapid sinking in its knee, the the left leg starts its backward kick. The right arm has started its push just before the left leg's kick.



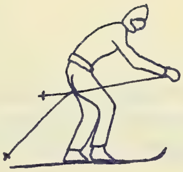
The left leg has almost completed its kick; when a gradual weight shift to the right leg starts. The right arm has finished its pole push. The left arm has almost completed its forward swing.



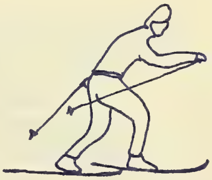
This is gliding: the right leg is now carrying all weight. The right arm has begun to swing forward, and the left pole is just being planted. Note the bend of the gliding knee and ankle.



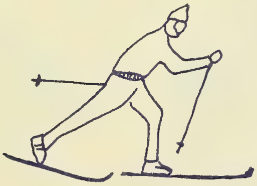
The left leg now swings forward; it is still unweighted. The right arm swings forward, while the left arm exerts downward force on its pole.



The left leg is even with the right, which now is weighted. This phase of the stride is just opposite to that of the first picture. The right leg starts its backward kick and the left arm has started its push.



The right leg has almost completed its kick. This phase of the stride is opposite to that of the second picture. The left arm has completed its pole push. The right arm has almost come completely forward.



This is gliding on the left ski, just the opposite phase to the third picture. The left arm has begun to swing forward, and the right pole is just being planted.

The illustrations show two complete paces of the diagonal stride. In the first four figures, the right leg and left arm are forward. In the last three figures, the left leg and right arm are forward. This is what is meant by diagonal - the diagonally opposite limbs follow one another in their forward and back movements.

Note that the head and shoulders stay relatively fixed, and do not bob up and down, or from side to side. Vertical or side to side motion does not push you forward and should be eliminated as much as possible.

If you have trouble co-ordinating your arm and leg movements, practise skiing the diagonal stride without poles.

In this and all the touring strides, the hand grip used on the poles is important. The correct grip sequence allows full relaxation and extension of the arms. Gripping the poles too tightly will restrict pole movement and tire you out quickly.

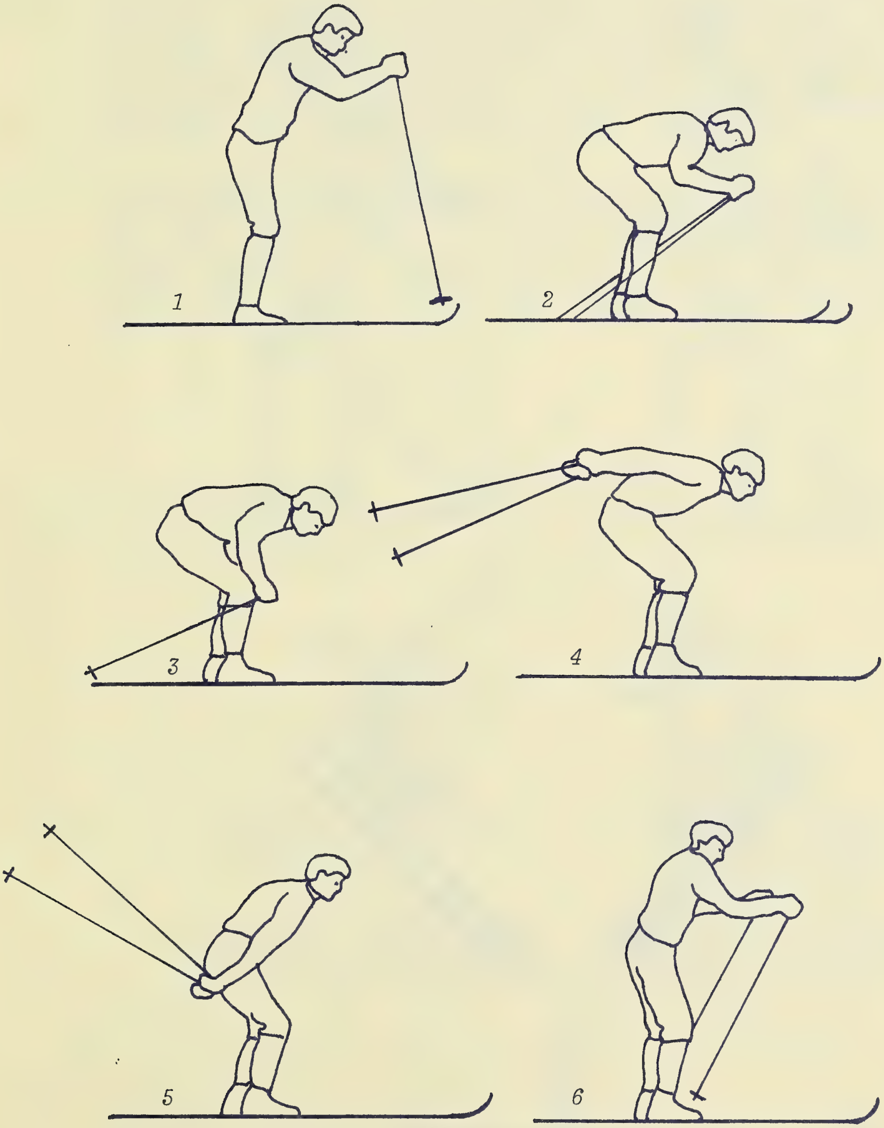
2. DOUBLE POLING

Double poling is a way of resting while running, as a change from the diagonal stride. Double poling is useful on slight declines to maintain speed, yet it allows the skier to relax.

Keeping the skis parallel, push with both poles simultaneously and glide, letting the poles trail behind you. Then plant the poles forward again and push as the skis glide past them.

DOUBLE POLING

Do not bend the head and shoulders too low during the maximum pushing phase (2) and (3).



DOUBLE POLING WHILE TAKING A STRIDE

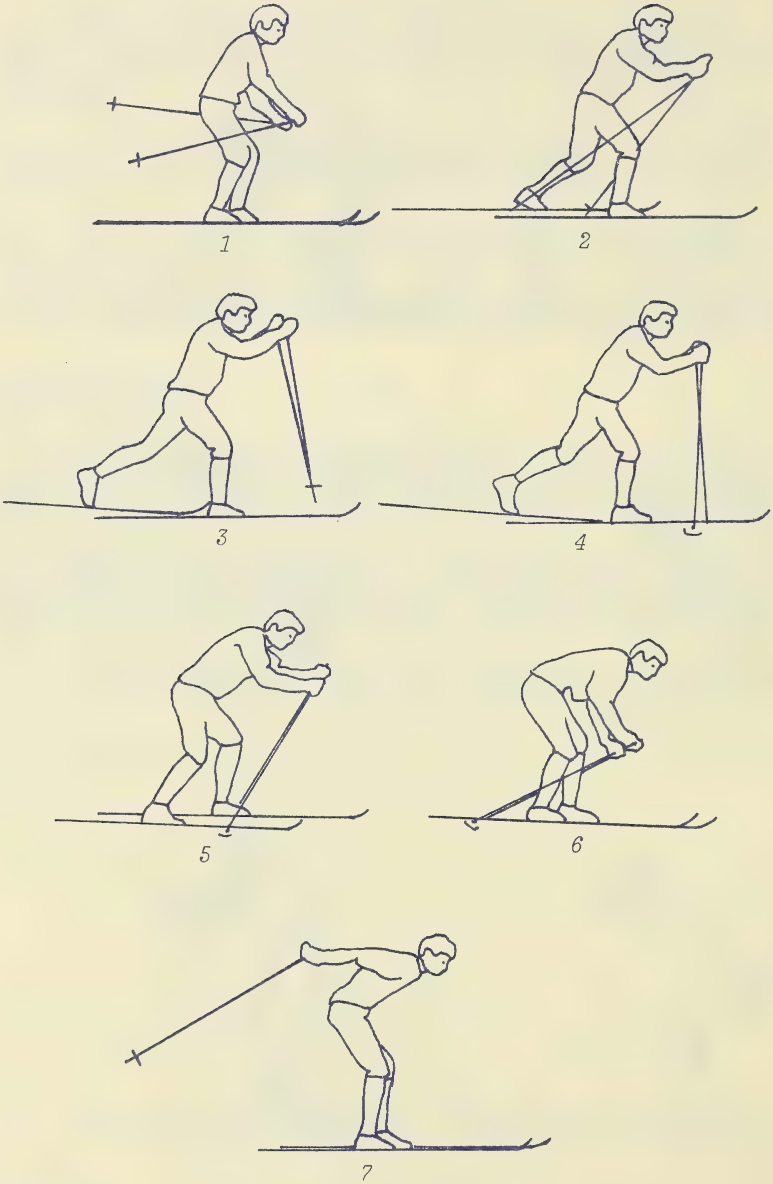


Figure 8

II. CHANGING DIRECTION - TURNS

1. THE STEP TURN

This is the most simple method of changing direction, but it is useful only when the terrain is level. Practise first without poles to get the feel and balance of your skis. Let's assume you want to turn to the right. Start with skis together in the basic body position. Then lift the right ski at a slight angle, tip brushing the snow, heel up, and place it in the snow. Transfer your weight to that ski and bring the other one next to it. Keep repeating the maneuver unil you have turned full circle. Then, for practice, try the step turn in the other direction.

With poles it's actually simpler, because placement of the pole helps you transfer your weight more easily. With poles, you can do the step turn on more of an incline. The pole is placed in the snow midway between the binding and tip in the direction you wish to turn. Your weight is shifted, and the other ski (and pole) are brought up to it and so on, into another full circle.

THE STEP TURN

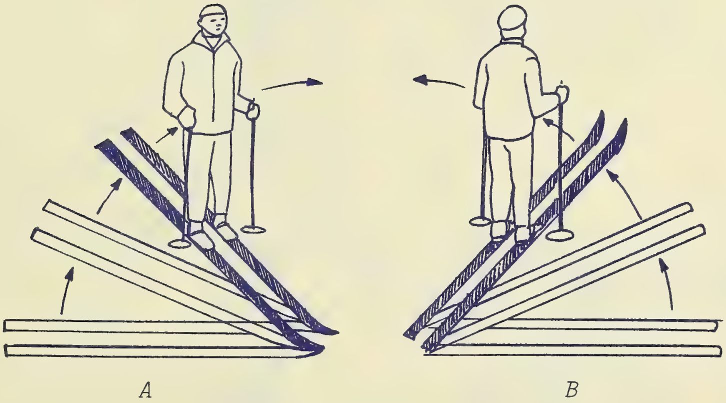


Figure 2 Stepping around in place, "A" indicates moving the tails of the skis first, one following the other; "B" indicates moving the tips.

THE STEP-AROUND TURN

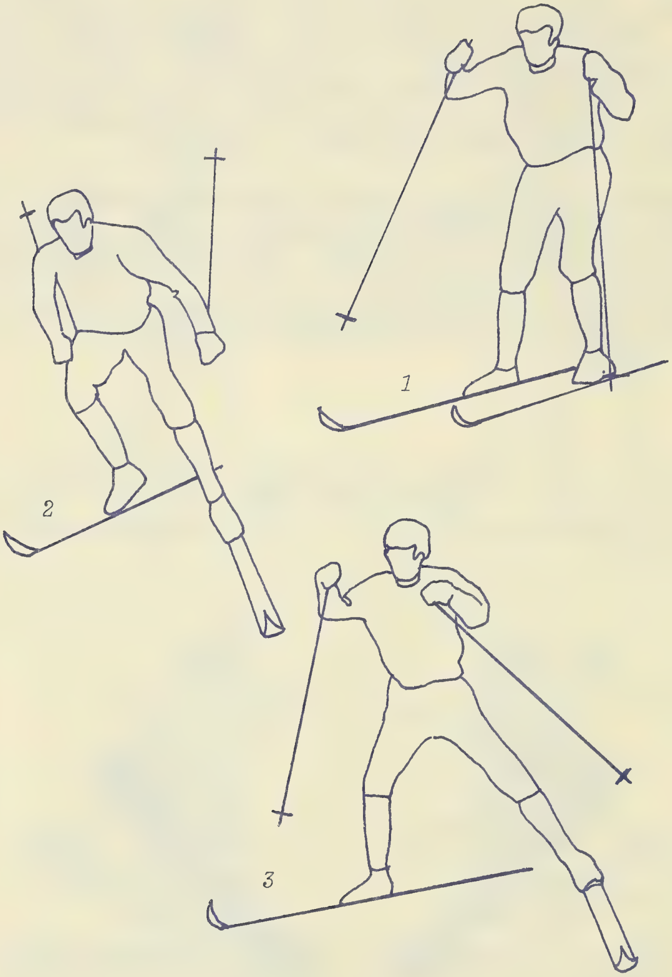


Figure 19   This turn will increase the skier's speed.

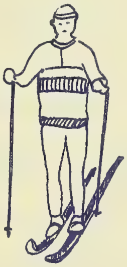
2. THE KICK TURN

A smooth kick turn is a necessary part of the repertoire of the person who intends to do much cross-country touring because it's the simplest method of changing direction in a standing position on a slope. Tourers use it when coming to the end of a traverse, either climbing or going downhill.

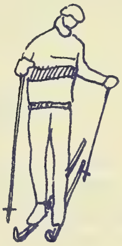
The kick turn should be done in one fluid movement. Assuming that you want to reverse your direction to the left, place your right ski pole near the outside tip of your right ski and your left ski pole near the tail of the left ski. Now, using the poles for balance, lift your ski so that the tail of the ski is in the snow near the inside tip of your right ski and let its weight carry it down toward the direction you wish to turn. Then, simply step around with the other ski, still using your poles for balance. You are now facing in the opposite direction from which you started.

Practise on the level first, then on an incline. On a steeper slope, leaning back against the poles slightly, helps make the turn easier.

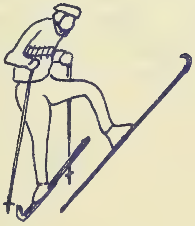
Skis are parallel and equally weighted, poles in front and unweighted.



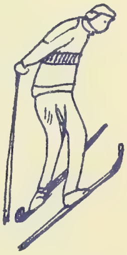
The "inside" pole is planted near the tail of the ski, weight remaining equally distributed on both poles for balance.



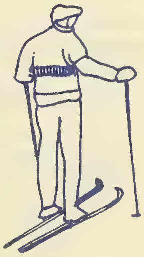
The inside ski is kicked up and forward. Pivoting the ski, the tip is brought down in the opposite direction.



The inside ski is now flat on the snow in the new direction. Weight is transferred to this ski and its pole.



The outside ski and pole are now brought around. This position is now the same as the first but the direction is reversed.



THE KICK TURN

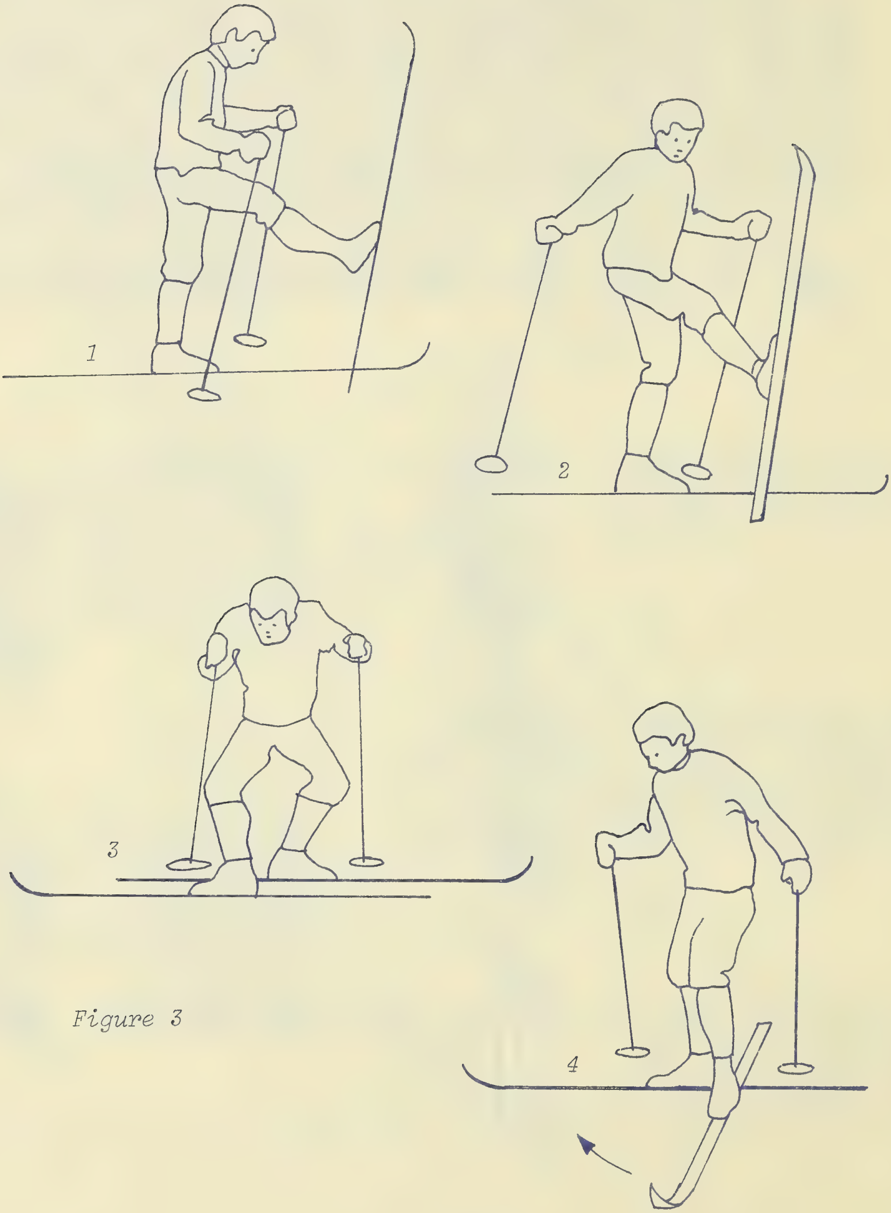


Figure 3

III. UPHILL TECHNIQUE

SKIING UPHILL

The cross-country track and the tourer's route are never precisely level. No skier would want them to be, because a great deal of the enjoyment of cross-country skiing is found in the handling of mixed terrain. A golf course that anyone can walk with ease in the summer is transformed by snow into a varied mixture of hills and gullies and makes surprisingly good cross-country territory. Exploring on your skis in winter will most likely take you uphill, and you should be able to engage slopes smoothly even though doing it properly may seem like punishment at first. Climbing at a regular pace, however, is the best stamina and strength building exercise you can find. Based on relative steepness, there are several methods of climbing, and you should be able to use them all.

The differences between the uphill and flat-terrain diagonal strides are then:

a) The glide phase is shorter.

b) The gliding knee is over the foot. This characteristic position is what keeps the ski from slipping backwards downhill.

c) Knees and elbows bend more to compensate for the incline.

d) Pole pushing movements are shorter.

e) The skier is more on his toes.

f) There may not be enough time or distance for complete extension of the arms.

1. STRAIGHT UPHILL CLIMBING

For lighter inclines, use the diagonal stride. The push-and-glide sequence is shorter, and while there is the temptation to bend from the waist, don't do it, but do keep the body weight forward. The experienced skier and the racer virtually sprint uphill, taking quick, short steps because they know they can double pole or rest in the downhill glide on the other side. Racers take steep uphill portions on a course as if they were flat. Racers, however, practise this as part of their running technique.

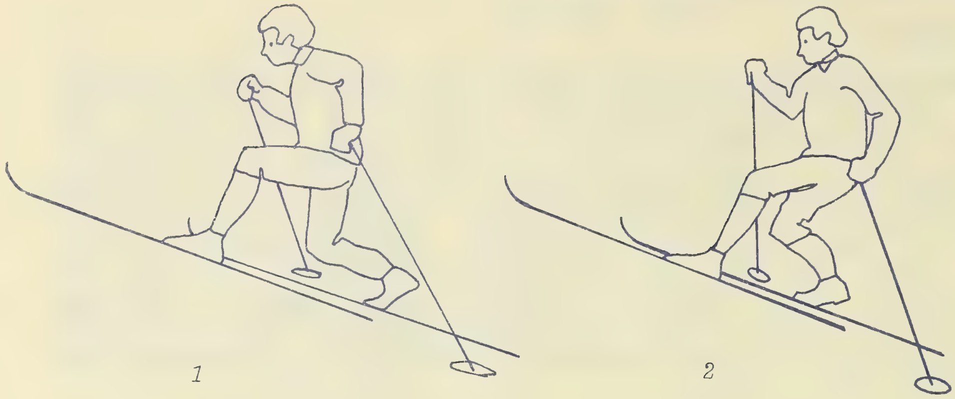
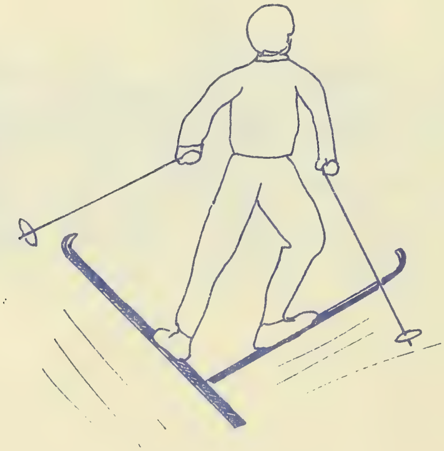


Figure 15 *(1) is proper; (2) improper. Keep weight forward and knees bent.*

2. THE HERRINGBONE

On steeper portions of the trail or on open slopes, going straight up is accomplished with the use of the herringbone, which is simply a series of V's up the grade. Skis are spread at the tips (but not too wide, the width of spread is dependent upon degree of slope) and, again using opposite arms and legs, plant the pole toward the tail of one ski and push forward onto the inside edge of the other. With that ski weighted on its inside edge, push with ski and pole, and lift the other ski into the opposite side of the V. There is a point of steepness where the herringbone is no longer suitable for climbing. It is also difficult to use on hard-packed ("concrete") snow surfaces, where new powder has been scraped clean, or on icy areas. Now the side step becomes more useful.



Herringbone: For climbing steeper slopes. The skis are in a V. Press the inside edges down to achieve control. The steeper the slope, the wider the V. Poles are never planted forward of the ski binding.

THE HERRINGBONE

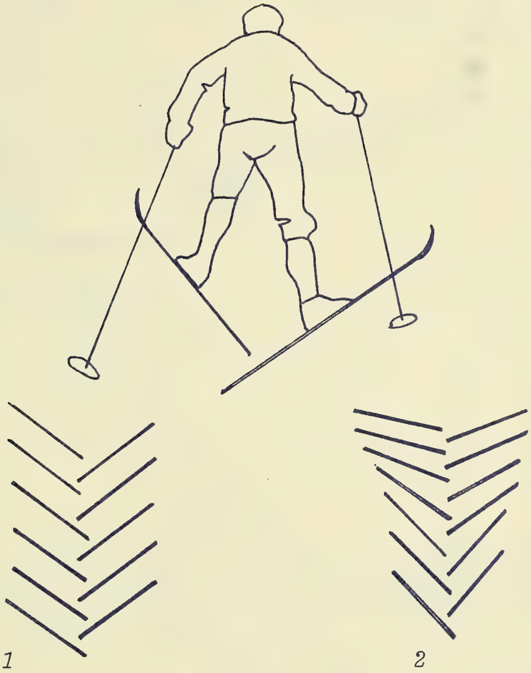


Figure 16 (1) Illustrates a track left on a uniform slope.
(2) Illustrates a track left on a slope of increasing steepness.

4. The Side Step

The side step is a simple but slow way of climbing steep slopes. It is part of the tourer's repertoire and allows him not only to climb, but to safely negotiate slopes that he cannot traverse or run downhill. It is rarely if ever used on a packed cross-country track.

Sidestep: Like climbing stairs sideways. Use the poles and skis together rhythmically and remember to keep the tips across the hill. Use pressure on the uphill edges of your skis so that the skis cut into the snow on the slope.

HOW TO SIDESTEP

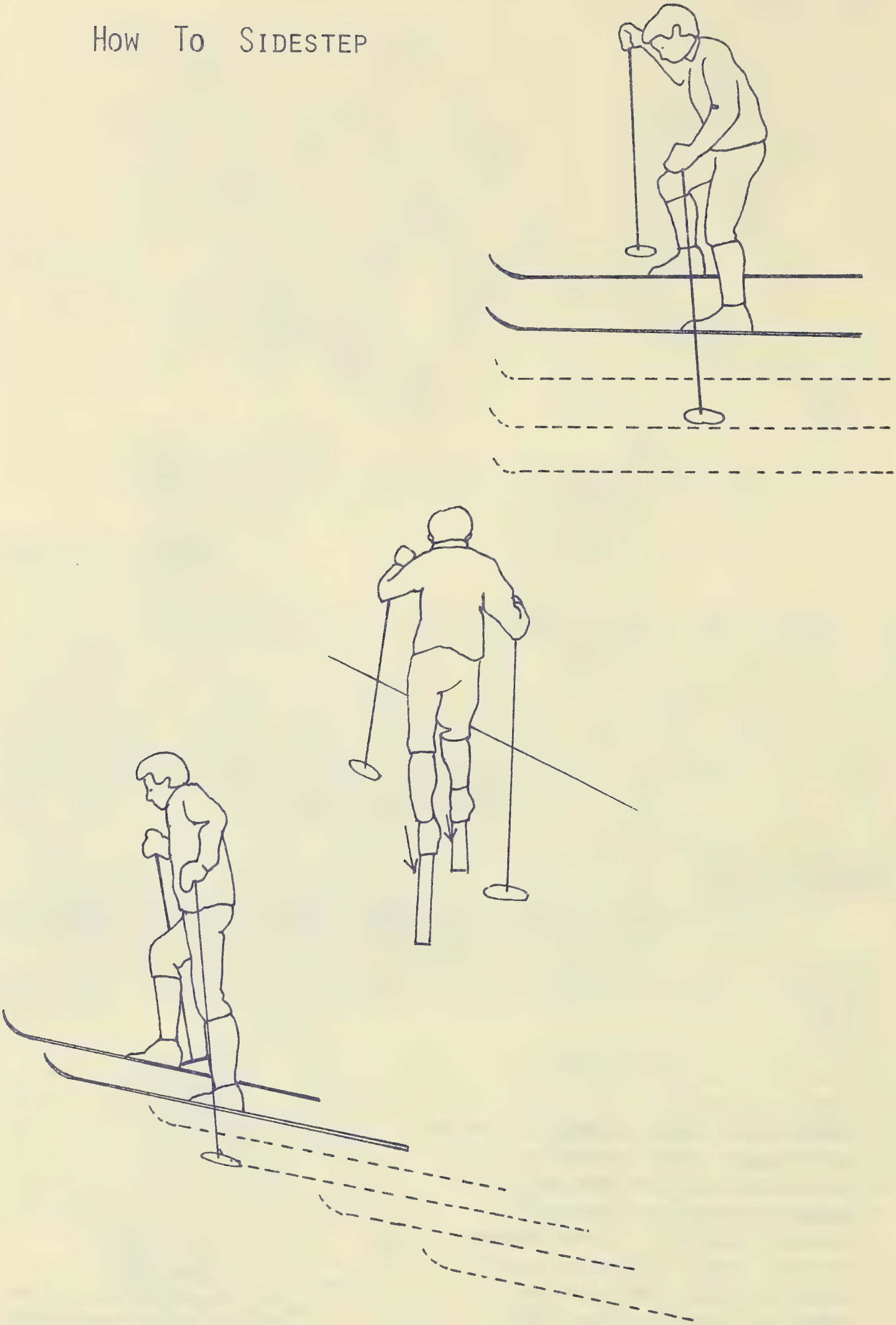


Figure 11 *Traversing while using a modified sidestep. Edge the skis into the hill to prevent backslip (see arrows).*

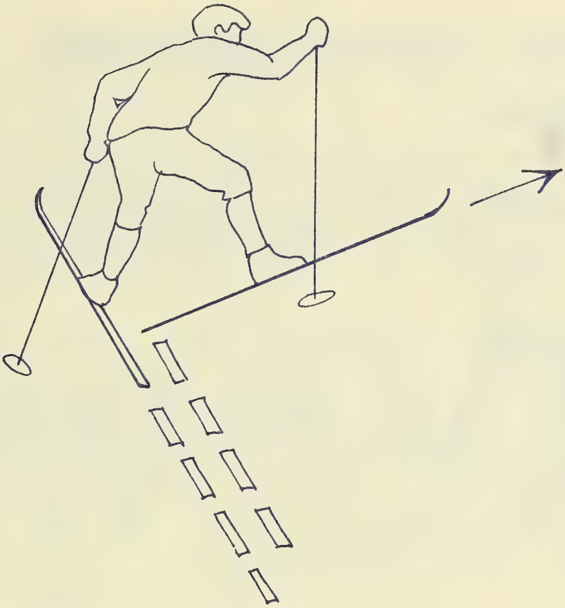


Figure 12   Changing direction on the traverse by using a partial kick turn. In this circumstance, make sure the right ski is firmly planted in the snow and will not slide before transferring your weight to it.

HILL CLIMBING ON A CORNER

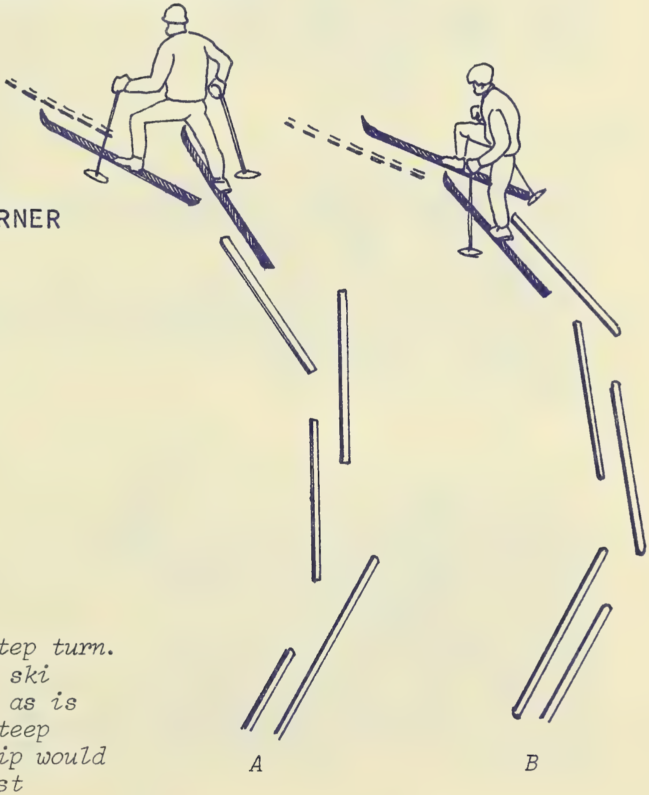


Figure 14

(A) Making use of the step turn.
(B) Placing the outside ski ahead of the inside as is necessary on very steep slopes where backslip would result from the first technique.

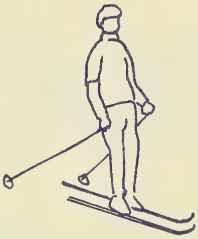
IV. DOWNHILL RUNNING AND TURNS

1. DOWNHILL RUNNING

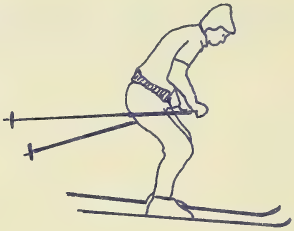
The downhill running stances used in ski touring are the same as those used in Alpine skiing. They vary from the more erect, natural athletic stance, to the high-speed egg position. The four most common positions are shown here along with the downhill snowplow.

The flat-terrain skating turn can be used on moderate slopes, whereas stem turns or stem Christianias can be done on almost any skiable slope. The sequence pictures show the phases of a stem turn to the right. More expert touring skiers and top cross- country racers can even do tightly linked parallel turns with the lightest of cross-country racing equipment. The sequence pictures show one turn of a Wedeln series. The older Telemark turn for deep snow is very seldom seen in modern ski touring. The stem turn is the most used standard downhill touring turn.

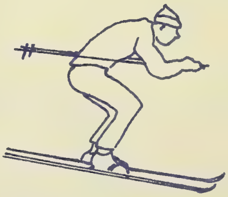
The basic wide-track downhill position. Ankles, knees, and hips are slightly bent, and these together with leg and lower back muscles supply balance.



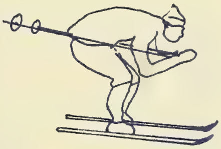
A more stable position for the touring skier. Ankles, knees and hips are bent more. The position is one of readiness. The knees are bent in a supple action to absorb bumps, changes in slope, or transitions to patches of sticky snow.



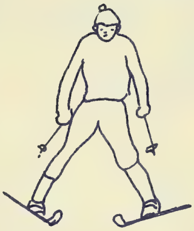
A high crouch or partial egg position, as often used by cross-country racers, and some touring skiers. Wind resistance is less than in either of the previous two positions, yet the stability is high. This position is preferred to the full egg when the terrain demands fast changes of position.



The full egg position is used in racing. The skier has a compact, streamlined position and the balance of the wide-track stance. However, the stability is not as high as that of the partial egg position; its compactness makes it hard to respond rapidly, or absorb great shocks.



The downhill snowplow can be used to regain balance, slow down, stop, or initiate a lower-speed turn.



STRAIGHT RUNNING

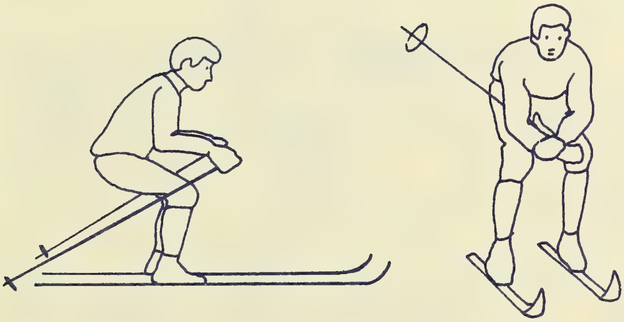


Figure 9 Straight running positions. Note that the skier's weight is on the tail of his skis.

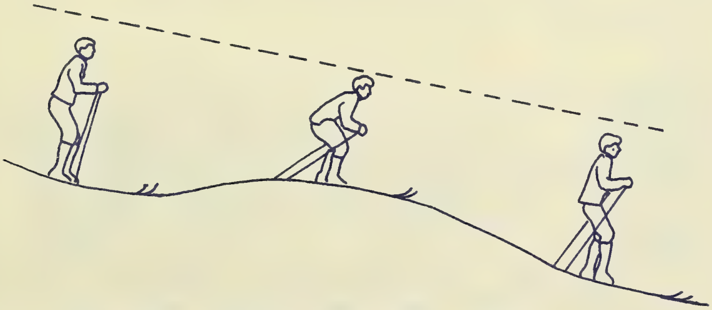


Figure 10 Straight running over bumps: Allow the knees to come up so that your head follows a more or less direct path down the hill.

THE TELEMARK POSITION

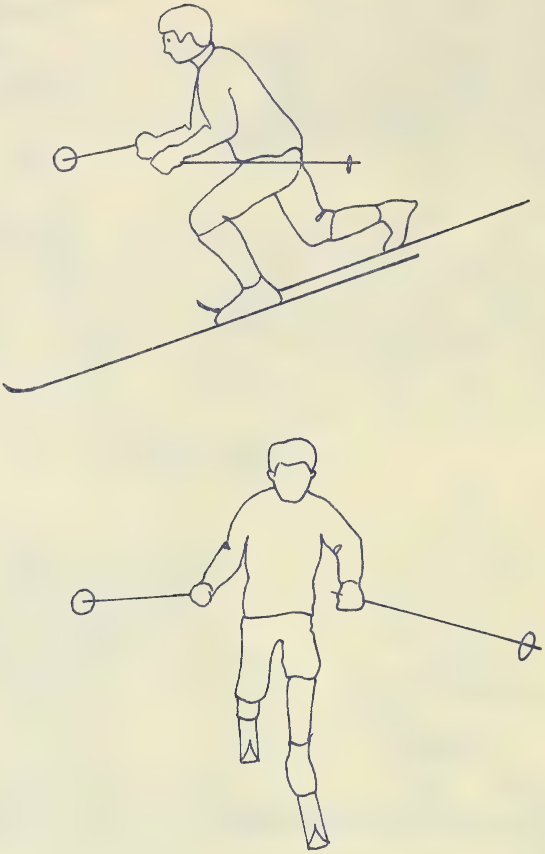


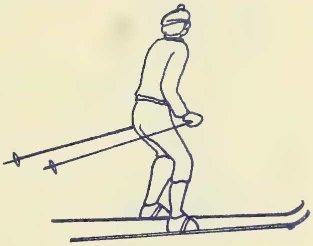
Figure 21 The telemark position is used for straight running over rought terrain or changeable snow.

The telemark position is used for skiing downhill over bumpy ground or where sliding conditions are unpredictable, for example in blown or drifted snow. To get into the telemark position, move one ski far forward, forming a right angle with the knee of the forward leg. The knee of the back leg almost touches the back ski so that the shin is parallel to the ski. This position is tiring to hold for a long time, so get in the habit of constantly changing legs. For coming straight down, the narrow stance needed for the telemark turn is not necessary. Thus, even the beginner will find it useful and, as one's balance improves, the distance between the skis will lessen. The main reason for using the telemark position is to increase one's stability on rough, downhill terrain.

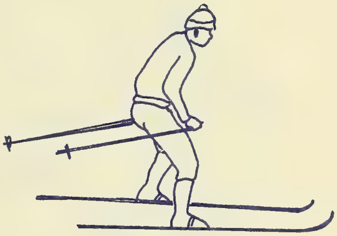
2. TURNS

a) Stem Turn

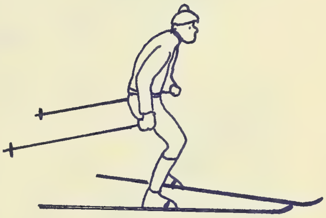
The skier is skiing on a downhill traverse in a wide-track position. A relaxed bend in the ankles, knees and hips is essential.



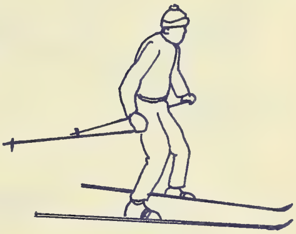
With weight mostly on the downhill (right) ski, the skier stems his uphill (left) ski out to point in the direction of the turn. Note that the body stance is still squarely over the skis.



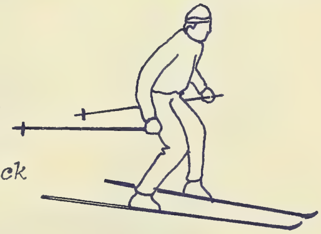
The skier weights the outside ski to start the turn. The inside (right) ski is almost completely unweighted. The body is squarely over the skis.



The weight is still on the outside ski as the ski come around to the new direction. The inside ski is still unweighted and begins to close in parallel to the outside ski.



The inside ski is now almost parallel with the outside ski and the skier is again skiing on a downhill traverse in the wide-track position.



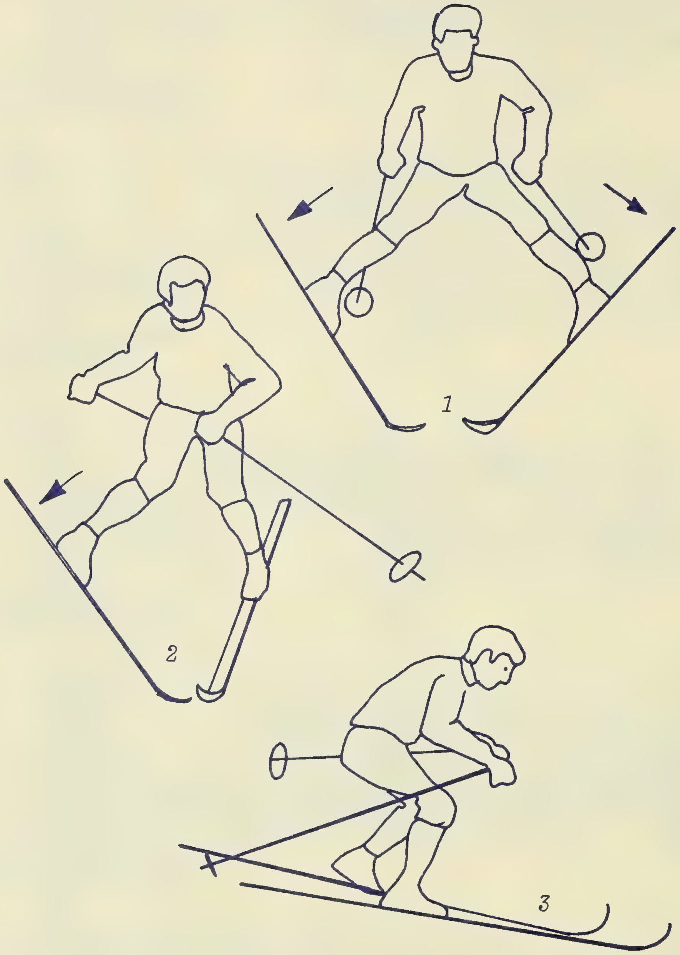
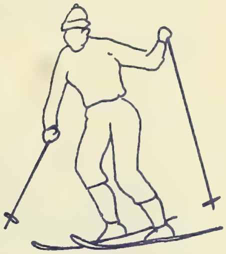


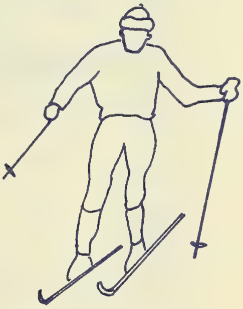
Figure 22 (1) Snowplow to check speed.
(2) Shift weight to outside ski to make stem turn.
(3) Complete the turn rejoining the skis in a traverse. This is often the only way to negotiate a hard packed slope, but undesirable on cross-country skis.

b) Wedeln

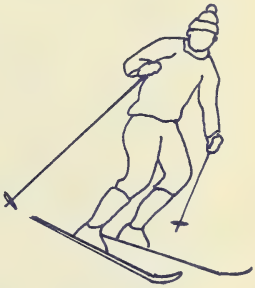
The skier is on a downhill traverse in a wide track position and is preparing to plant his inside (left) pole. Ankles, knees, and hips are bent for a slightly deeper stance than used in the stem turn.



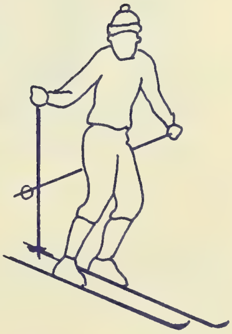
The skier moves up as he weights his outside (right) ski and plants his inside pole to initiate the parallel turn. The inside ski is completely unweighted.



The skis are now pointing in the new direction. Ankles and hips move to side. Slip the skis around to the new direction. Note that the body is squarely over the skis.



The skis are now pointing in the new direction. This is the opposite of the first picture; the skier is now preparing to make a turn to the right.



THE DOUBLE POLE JUMP TURN

In heavy, wet snow or breakable crust the jump turn is usually the only way to check speed or change direction. This is a slightly more advanced technique, so take it easy. Here is how it is done: Start out in a relatively flat traverse, that is, nearly perpendicular to the fall line. When you reach a speed of no more than five miles per hour, bring both poles forward at the same time, planting them with their baskets touching, a few inches from the tips of both skis on the downhill side. Spring forward, pivoting on your poles and turning while airborne to a position perpendicular to the fall line, with the skis pointed in the opposite direction, a little farther down the hill. On really steep hills, it is possible to drop twenty feet or more in one jump. Cross-country and touring equipment is ideal for this maneuver because it places little strain on the skis or bindings, yet the jump is easy because of the light weight of the equipment. Important points to remember are: timing the leap to follow the placement of the poles all in one motion, then quickly rotating the body practically horizontally, then pushing off with the poles for a longer jump, finally dropping down into the snow upright - balanced and ready to prevent further sliding by edging the skis into the hill. The jump turn requires finesse and control. At first your feet will slide out from under you; you will land on your side, or, perhaps, you will fall over after landing because of too much downhill momentum of the upper body. Strangely enough, this maneuver is easier to do on a steep hill than on a fairly easy one, because the steeper the slope, the more time you have while in flight to get your body ready for the landing. On landing, your knees should be flexed and your arms low to lower the center of gravity as much as possible. Begin by practising off the edge of a small bump, with a fairly steep slope. Eventually you will be able to link jump turns, never coming to a complete rest between them. The jump turn is the expert's way of negotiating steep and narrow trails. They are more difficult to do in deep powder simply because it is harder to plant the poles, particularly if they have very small baskets.

THE DOUBLE POLE JUMP TURN

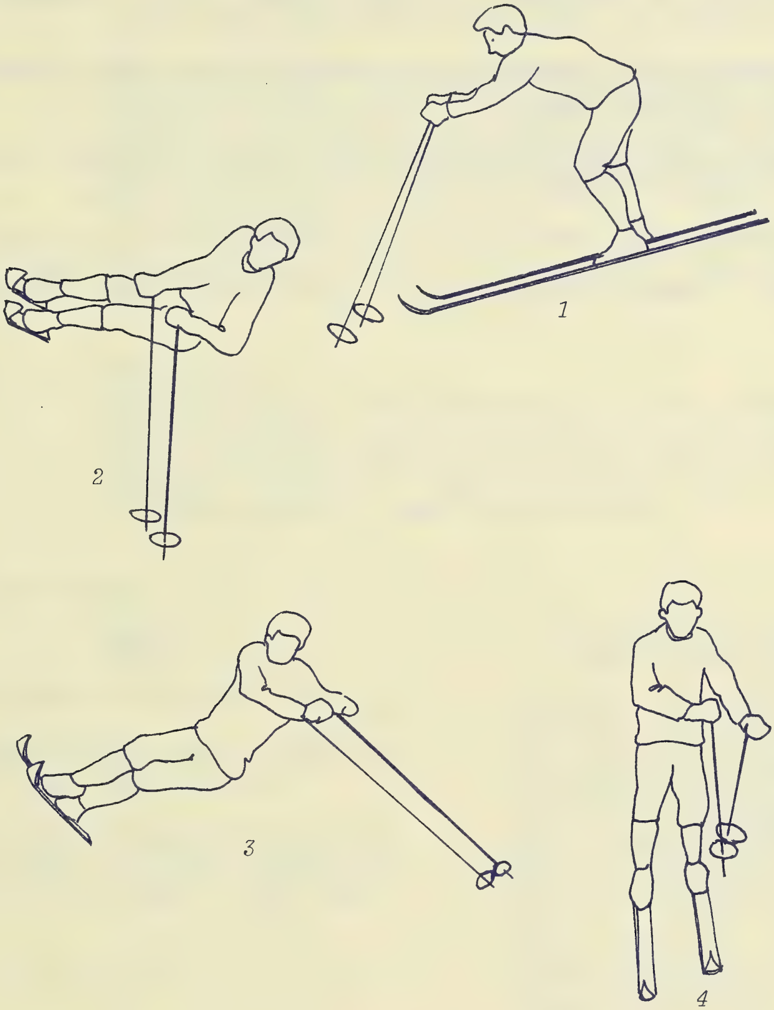


Figure 25 A useful turning maneuver in heavy wet snow or breakable crust, this is a simple turn, but requires precise timing of the jump.

PROGRAM IMPLEMENTATION

Children of all ages may be easily introduced to cross-country skiing provided the equipment is of the proper sizing. However, the teaching approach will vary for the different grade levels.

"Exploration" is the key to enjoyment of cross-country skiing for elementary school children.

Avoid formal instruction at the Grade 1 and 2 levels, and minimize it from Grade 3 through Grade 6.

The lesson guide that follows will briefly outline activities you may involve your children with in order to guide them to proper skill development in cross-country skiing.

LESSON 1

Objective: Introduction to skis - waxing, skis and poles, clothing, and organization.

GRADE THREE

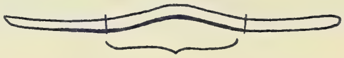
Overview: This initial lesson is to be done in the classroom. The lesson is designed for the purpose of organizing the children for skiing, matching skis and boots to children, discussion of waxing, and a lecture on proper clothing. This lesson should occur in the room or gym where the skis will later be distributed each ski lesson.

Equipment: Cross-country skis, poles, boots.

Introductory Activity:
Setting the skis, poles and boots out in the room/gym. Some identifying mark (a number on a piece of tape) should be placed in the boots and on the skis for identification purposes. Children will need this to find the skis, poles and boots assigned to them for each lesson.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Matching equipment to children. Match the equipment to children as closely as possible. Record the names of the children and their equipment number/letter on a master copy of your class list.	1) Equipment - It will be difficult to match the correct size equipment to each child. However, a teacher is encouraged to attempt to apply the following principles in matching equipment to children as much as possible. Boots - should fit with two pairs of socks, at least one of which should be a thick wool pair. Skis - should, when stood up vertically beside the child with arms raised above head, come up to the wrists. Poles - should, when stood up vertically beside the child, come up to his/her armpits.

TASKS	TEACHER SUGGESTIONS
2) Waxing principles discussed. Demonstrate to your class the correct waxing procedure. (Note: Skis probably only need to be waxed once every two or three days ..... if the majority of work outdoors occurs in the school yard. Therefore, the staff should consult together concerning the responsibility for waxing.)	2) Waxing Discuss the waxing options. Green wax is for cold weather (-10°C. to -18°C.) conditions and blue is for warmer weather conditions (0°C. to -10°C.) Application - wax is applied liberally and evenly along the camber or middle of ski. Application is done only on dry skis.  Scraping and corking - If wax builds up, cold wax should be scraped off. New wax should be corked on, particularly on the bow of ski, or the camber.
3. Clothing principles discussed. Wear more than "enough" clothing. Clothing can be removed if skier gets too warm. Layer principle - It is better to wear more layers of clothing, than one large bulky layer. Layers can be removed if necessary. Covering extremities - wrists, necks, and ankles are important areas to cover. Turtle necks, long mitts or gloves and a second pair of woolen socks worn over the pants can help here. Clothing type - wool, heavy cotton, and other breathable fabrics are superior to synthetics.	3) Clothing The teacher may find it valuable to "dress the part", or actually demonstrate the principles being discussed. Layer 1 - Lifa, fish net or cotton underwear, cotton socks. Layer 2 - Turtleneck, wool, or flannel shirt, knickers, sweat pants, or loose, stretchy slacks and knee socks. Layer 3 - Heavy sweater, leather or nylon outer mitts with wool inners, toque, gaiters, bellaclava.

Consolidation: Films or film strips are useful motivator at this stage.

Evaluation of Lesson:

LESSON 2

Objective: Exploration - movement exploration on playground without poles.

GRADE THREE

Overview: This second lesson is designed to have children explore balances, travels and shapes on skis. It is highly exploratory in nature and the teacher needs to present tasks or challenges to the children to help them begin to feel some of the underlying skills in skiing. The philosophy that children should be taught complex skills in the whole part - whole method is the basis for the whole unit on skiing. Exposing children to the whole skill (this lesson) is followed by exposing them to part(s) of the skill in Lessons 3 - 6. In the final lessons, the application, children use cross-country skiing in a functional, whole and practical way by travelling or touring.

Equipment: Cross-country skis, poles, boots.

Introductory Activities:
Skis are brought outside. There, children put them on. Instructions are given regarding the area in which the children will be travelling. Allow 5 - 6 minutes of time for children to get accustomed to the new conditions.

Skill Development:

TASKS

1) Exploration of falling without poles.

Can you fall where you are standing: to your right side... to your left side... behind you?

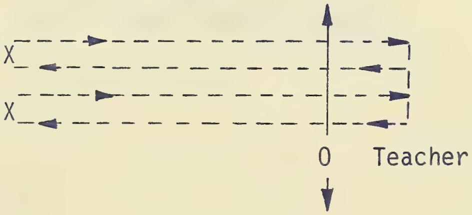
Can you fall these different ways while moving?

2) Exploration of falling with poles.
Repeat the above with poles.

TEACHER SUGGESTIONS

It is suggested that teachers adopt one of the following methods of organizing the children for presentation of the tasks.

Method 1



TASKS

3) Exploration of making shapes without poles.

Can you make a stretched, wide shape? A stretched long shape? A different kind of stretched shape?

4) Exploration of making shapes with poles.

5) Exploration of balances with poles.

Show how you can balance on one ski. Can you balance on the other ski?

Can you balance on one ski at a low level? At a medium level? At a high level?

Can you slide forward and stop, then balance?

6) Exploration of balances with poles.
Repeat the above tasks with poles.

7) Exploration of various locometer travels without poles.

Can you walk on your skis?

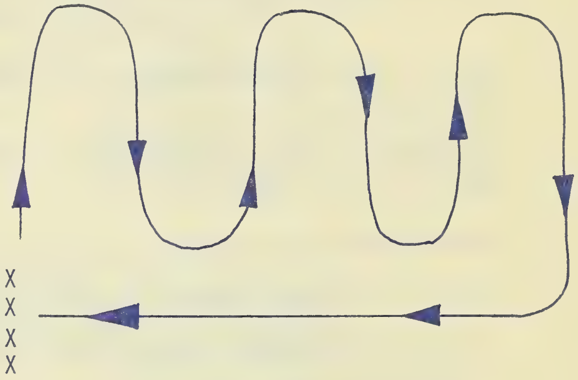
Show the following travels on your skis: hops, jumps (one to two, two to two, two to one) with different landings, runs, slides.

Can you try these travels going to your right ... to your left?

TEACHER SUGGESTIONS

Children line up facing you. They ski to a designated spot 25-35 metres away. Here they turn, and return to their original spot. They create a track that enables them to ski without breaking new trail. The teacher skis as indicated in the diagram. The challenges are issued to children at either end.

Method 2



Children line up behind you and ski along the route indicated in the diagram. The track is created therefore in the figure shown. The teacher can leave the track and transverse it, going in among the children, stopping them when necessary to issue new challenges.

TASKS	TEACHER SUGGESTIONS
8) Exploration of various locometer travels with poles. Repeat the above tasks with poles.	

Consolidation: Time should now be provided for children to explore, with poles on their own. Keep children on the track you have set up.

Evaluation of Lesson:

LESSON 3

Objective: Striding - striding explored without poles.

GRADE THREE

Overview: The basic travel movement in skiing is the diagonal stride... just as in walking. This lesson is designed to explore this stride and, as well, turns. It is suggested that teachers employ one of the two methods of class organization found in Lesson 2, page 41.

Introductory Activity:
Assemble students. Allow 5 - 6 minutes of travelling along the route. This should be done without poles. The result will be a track(s) in which children can ski unimpeded.

Skill Development:

TASKS

1) Exploration of diagonal stride without poles.
   - Can you walk on your track?
   - Can you walk again but show a little more force or exertion on the walking kick?
   - Repeat, and progressively increase this force.
   - Repeat and swing arms loosely and exaggerated a bit ... and bend slightly forward.
   - Keep your eyes about 10 metres in front of you.
   - Try to increase the length of the glide a little more each trip on the track.

TEACHER SUGGESTIONS

Children will, at this stage, require only one method of changing direction when they reach the end of the track ..... the step turn. A brief demonstration by the teacher followed by practise by the children is sufficient for now.

The Step Turn

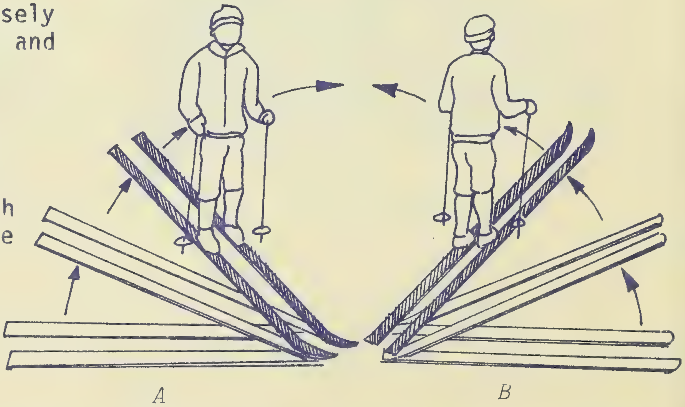
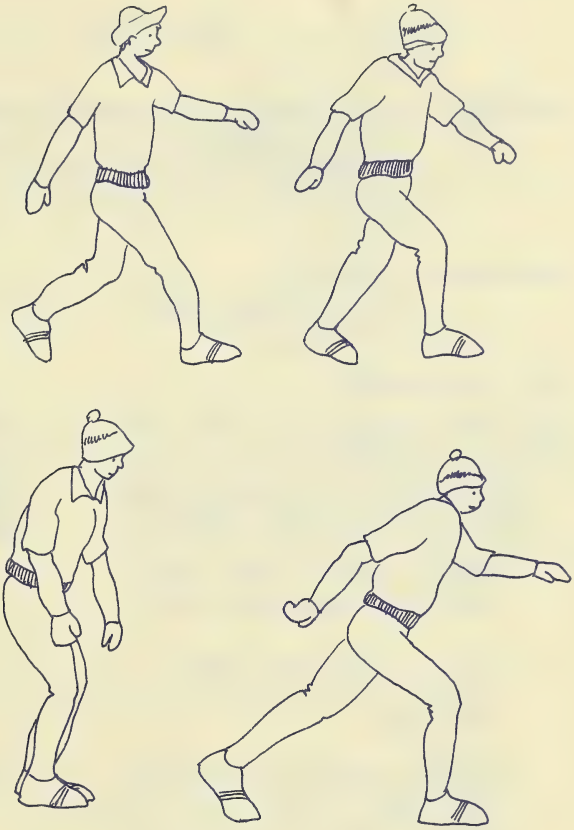


Figure 2 stepping around in place, "A" indicates moving the tails of the skis first, one following the other; "B" indicates moving the tips.

TASKS TEACHER SUGGESTIONS



Consolidation: 1. Monkey Drill - have the children face you .... in scattered formation facing you. Point in the direction you want them to go. They travel in that direction.

2. Simon Says - Children in scattered formation again facing you. Lead the children through the tasks explored in Lesson 1 - (shapes, balances, and travels).

Evaluation of Lesson:

LESSON 4

Objective: Striding - striding explored with poles.

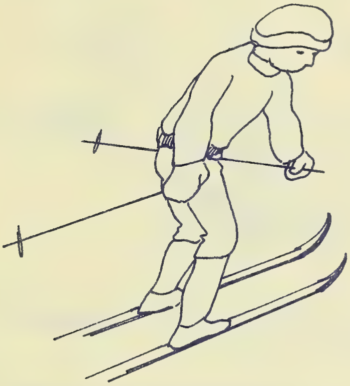
GRADE THREE

Overview: This lesson is designed to have children explore the basic strides using poles. It is suggested that the diagonal stride be taught with poles first carried .... then used in conjunction with the stride.

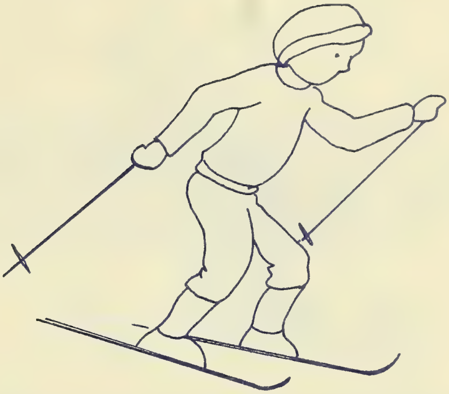
Introductory Activity:
3 - 5 minutes skiing on track without poles.

Skill Development:

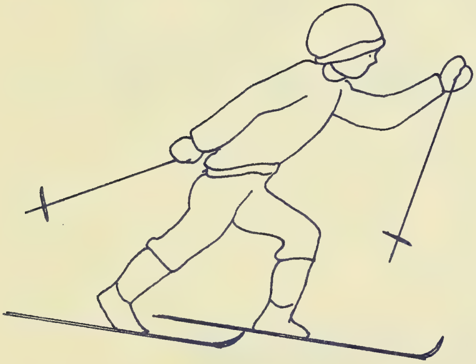
TASKS	TEACHER SUGGESTIONS
1) Exploration of diagonal stride with poles carried in hands.	Poles should be held in each hand, halfway up the shaft.
- Can you walk on your track while carrying your poles?	
- Can you swing your arms, easily in full extension back and front?	
- Repeat, practise your glide and thrust down on your kick. Stretch out.	
2) Exploration of diagonal stride using poles.	Poles are primarily used to maintain rhythm and to keep balance. They help little in the actual thrusting forward or glide.
- Repeat the above tasks using poles.	In grasping the poles, the hand goes through the loop entirely. Then, the hand closes on the handle and grasps the loop between the hand and pole handle.
- Practise. Decrease your number of strides each trip. Try for one less each time.	



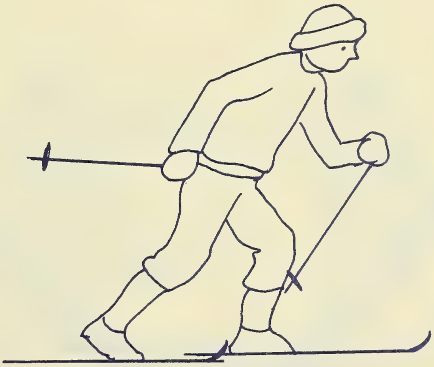
The right leg is even with the left, which is now weighted. With a slight, rapid sinking in its knee, the left leg starts its backward kick. The right arm has started its push just before the left leg's kick.



The left leg has almost completed its kick; when a gradual weight shift to the right leg starts. The right arm has finished its pole push. The left arm has almost completed its forward swing.

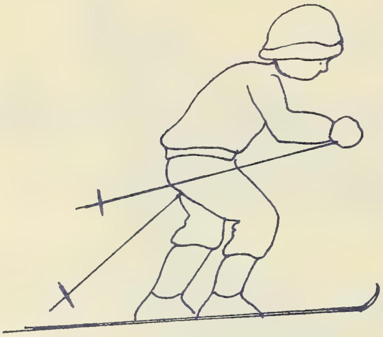


This is gliding: the right leg is now carrying all weight. The right arm has begun to swing forward, and the left pole is just being planted. Note the bend of the gliding knee and ankle.

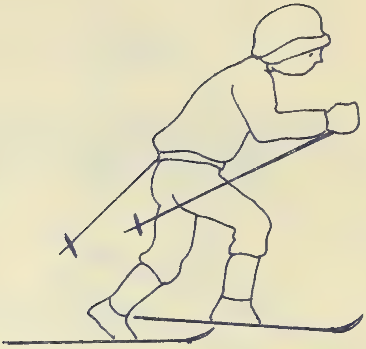


The left leg now swings forward; it is still unweighted. The right arm swings forward, while the left arm exerts downward force on its pole.

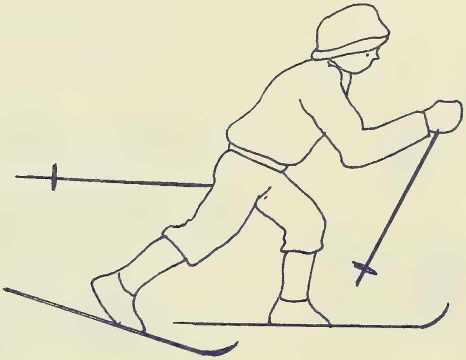
TEACHER SUGGESTIONS (Cont'd)



The left leg is even with the right, which now is weighted. This phase of the stride is just opposite to that of the first picture. The right leg starts its backward kick and the left arm has started its push.



The right leg has almost completed its kick. This phase of the stride is opposite to that of the second picture. The left arm has almost completed its pole push. The right arm has almost come completely forward.



This is gliding on the left ski, just the opposite phase to the third picture. The left arm has begun to swing forward, and the right pole is just being planted.

Consolidation: School yard trip - A tour of the school yard or playground school now occur.

Evaluation of Lesson:

LESSON 5

Objective: Turns and falls.

GRADE THREE

Overview: Skiing conditions along trails etc. present a variety of challenges not found in school yards. Therefore, there is a need for a lesson that focuses on turning while on skis and on falling and rising while on skis. We'll examine three basic methods of turning .... and basic technique in falling.

Equipment: Skis, poles, boots.

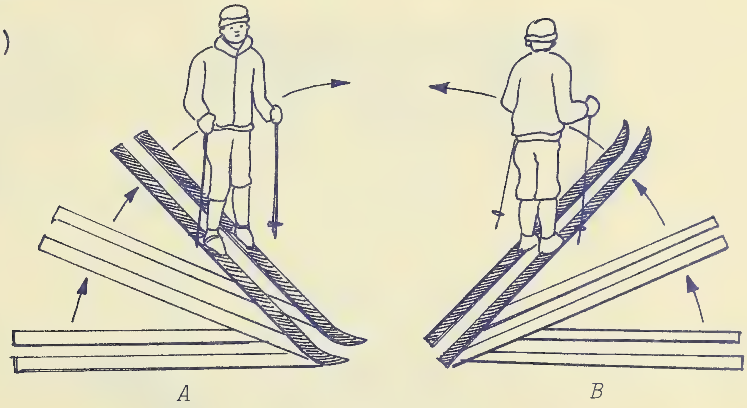
Introductory Activity:
Check wax conditions on skis. Shadow activities on skis. One person leads and performs various shapes, balances and travels. A partner follows (see Lesson 2, page 41).

Skill Development:

TASKS	TEACHER SUGGESTIONS

1) Exploration of the step-turn.

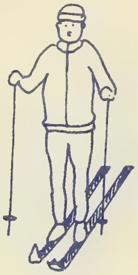
Can you step-turn in both directions?
(tips first, then heels)



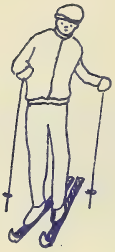
Stepping around in place, "A" indicates moving the tails of the skis first, one following the other; "B" indicates moving the tips.

TEACHER SUGGESTIONS (cont'd)

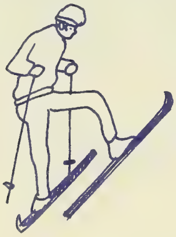
2) Exploration of the kick-turn.



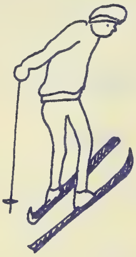
Skis are parallel and equally weighted, poles in front and unweighted.



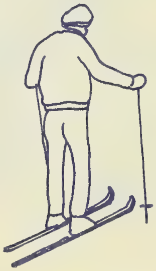
The "inside" pole is planted near the tail of the ski, weight remaining equally distributed on both poles for balance.



The inside ski is kicked up and forward. Pivoting the ski, the tip is brought down in the opposite direction.



The inside ski is now flat on the snow in the new direction. Weight is transferred to this ski and its pole.

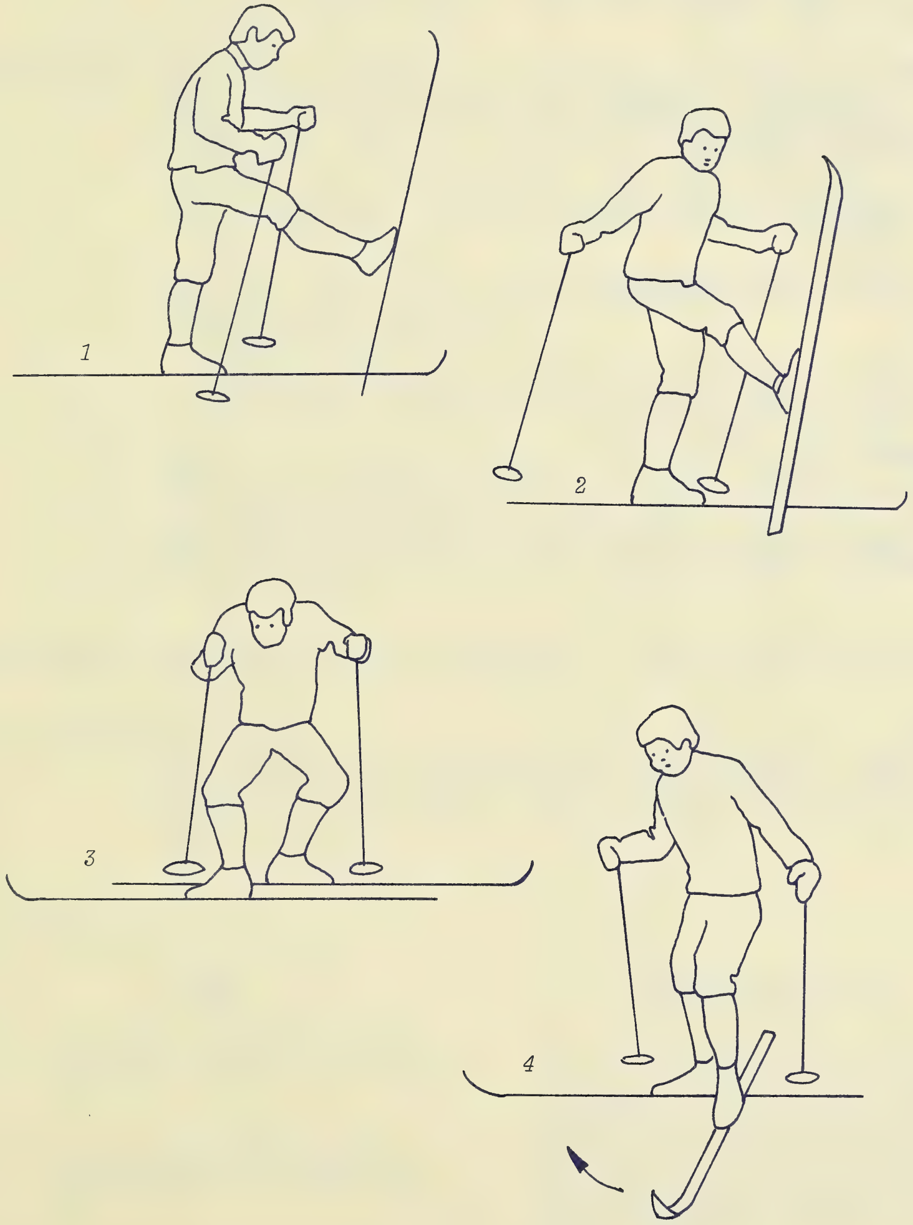


The outside ski and pole are now brought around. This position is now the same as the first but the direction is reversed.

Practise both directions.

TEACHER SUGGESTIONS (cont'd)

THE KICK TURN



TASKS	TEACHER SUGGESTIONS
3) Exploration of falls.	
Can you travel on skis and fall to your right side?	
To your left side?	
Can you fall backwards, sitting between your skis?	
Can you get up without using your poles?	
Can you get up by using your poles?	
Practise falling onto your side hip and get up by rolling onto your back, placing your skis perpendicular.	

Consolidation: School yard tour in pairs.

Evaluation of Lesson:

LESSON 6

Objective: Hills-exploration of travels up and down hills.

GRADE THREE

Overview: Cross-country skiing hardly ever utilizes a totally level route. Uphill skiing requires changes in technique and methodology. Two main methods of skiing uphill will be examined, direct hill climbing either straight up or at a diagonal, and side stepping up. Two methods of skiing downhill will be examined. Snowplowing and straight running.

Teachers might find it useful for this lesson to simply keep in mind that four aspects will be explored:

- sidestepping up hills
- skiing directly up hills
- snowplowing down hills
- skiing directly down hills

Tasks set in each of the four areas should follow the movement education philosophy initially. Here, questioning techniques are used to help children develop and learn the skills required for the final product. A task card with questions kept in a pocket is useful.

Equipment: Skis, poles, boots, elevations in schoolyard.

Introductory Activity:
Take children to an elevated part of the grounds. Space children to ensure safety when falling. Issue the challenge: Climb to the top of the hill and come down in a variety of ways.

Skill Development:

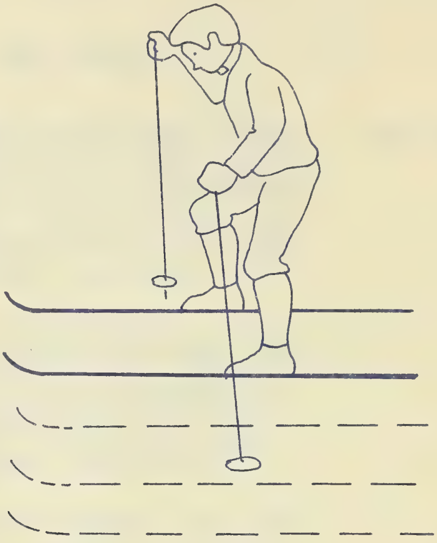
TASKS	TEACHER SUGGESTIONS
1) Exploration of sidestepping directly up a hill and down a hill. Can you face sideways and travel up the hill/down the hill? Can you turn and face the other way and travel up the hill/down the hill?	The introductory part of the lesson is, by its open-ended nature, designed to have the children experiment and explore the whole skill(s) of going up and down hills. The exploration continues with tasks set by the teacher that lead to the developing of technique and skill.

TASKS

TEACHER SUGGESTIONS

Can you travel this way up the hill facing one direction, turn and come down facing the other direction?

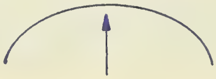
Travel this way taking large steps/smaller steps.



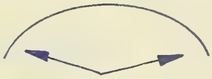
Edge the skis into the hill to prevent slipping forward or backward.

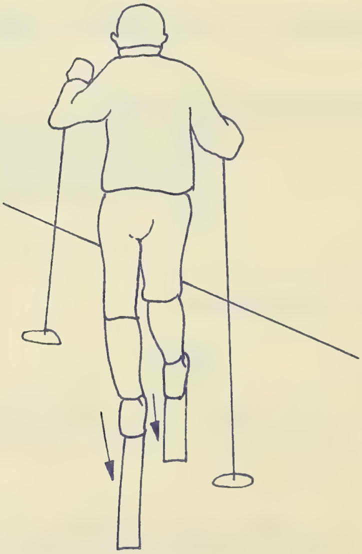
2. Exploration of direct hill climbing.

Can you face the hill and climb going straight up? Sidestep coming down.



Can you climb straight up at an angle. Sidestep coming down.



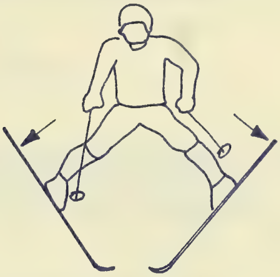


TASKS

TEACHER SUGGESTIONS

3. Exploration of snowplow technique coming down the hill.

Can you come down the hill using the snowplow? (Travelling up the hill, using one of the methods practised.)

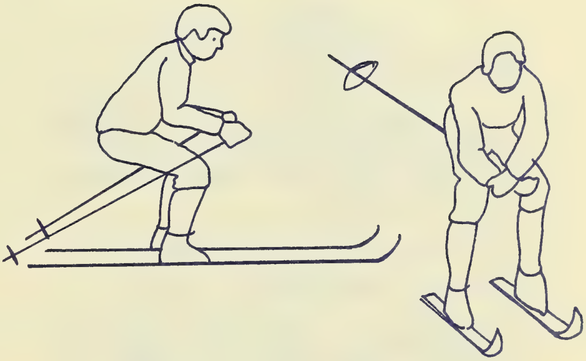


4. Exploration of straight running downhill.

Keep your skis together, travel downhill.

Travel downhill while standing tall/while crouching.

Travel downhill with one ski in front.



The hill used should at first be no more than one to two meters high. Gradually increase the height students explore on.

Consolidation: Practise.

Evaluation of Lesson:

LESSON 7

Objective: Review of hill work. (see Lesson 6, page 53).

GRADE THREE

Overview: Lesson 6 provided a foundation for skiing hills. This lesson is both a review and an extension of the work covered in that lesson.

Equipment: Skis, poles, boots, hill(s).

Introductory Activity:
Hill exploration activities (review of last days work).

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Copying activities in pairs. One person travel up the hill. The partner watches .... then copies the travel up. Repeat coming down.	
2) Individual work with children - one to one basis. (While children are working in pairs, the teacher can work on an individual basis with children who require assistance).	

Consolidation: Practise.

Evaluation of Lesson:

LESSON 8 & 9

Objective: Touring - schoolyard and beyond.

GRADE THREE

Overview: Opportunities to explore untried, and perhaps more difficult terrain, is a worthwhile application of the skills learned previously. Parks, canyons, or trails along the river can be used.

Equipment: Skis, poles, boots and teacher supplies.

Introductory Activity:
Preparation for trip, discussion of proper clothing, behaviour and of procedures while on the tour.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Assemble children at the location. Assign children to adult leaders. Set off on the trail.	It is strongly recommended that teachers follow the suggestions listed below in their organization and carrying out of the tour. 1. Get adult assistance. A ratio of 8 children to 1 adult is desired. Parents, or members of local ski clubs may assist. 2. Prepare children by reviewing principles of proper dress for winter activities (see lesson page 40). 3. Teachers should review general first aid procedures. They should carry a soft pack (backpack) in which the following items need to be included: - matches (in plastic bag) - jackknife - nylon cord or string (2 meters) - ski tip replacement (if wood skis are used) - cans of green and blue wax, scraper and cork - first aid kit

Evaluation of Lesson:

LESSON 10

Objective: Orienteering

GRADE THREE

Overview: An interesting way of applying skills learned in the cross-country skiing unit is through orienteering. An orienteering course can be set up in the school yard.

Equipment: Skis, poles and boots. Score sheets, pencils and cardboard/manilla tag cards with letters of alphabet written in felt markings.

Introductory Activity:
Teacher(s) select 10 control points. Place the cardboard/manilla tag cards at these points. Record on your master control sheet the location of the cards.

Assemble students. Explain the procedure to be followed. Assign an arbitrary time limit, a whistle will indicate when students should return.

Distribute score sheets and pencils. Students are to record the letter from the card into the appropriate place on their score sheet.

Skill Development:

TASKS — TEACHER SUGGESTIONS

Sample score sheet might be devised as follows:

Name ______________________ Time ______________________

No.	Code Letter	Value	Control Description
1		10	north corner of block
2		10	"swinging" (swing set)
3		10	southwest corner of school
4		15	tallest tree on school yard
5		15	goal posts
6		5	office window
7		5	tetherpool
8		10	skating rink fence
9		10	school sign
10		15	teeter totters

Students place their letter found on the card in the appropriate place in the second column.

Consolidation: Return and total points.

LESSON 1

Objective: Introduction to skis - waxing, skis and poles, clothing, and organization.

GRADE FOUR

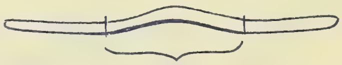
Overview: This initial lesson is to be done in the classroom. The lesson is designed for the purpose of organizing the children for skiing, matching skis and boots to children, discussion of waxing, and a lecture on proper clothing. This lesson should occur in the room or gym where the skis will later be distributed every ski lesson.

Equipment: Cross-country skis, poles, boots.

Introductory Activity:
Setting the skis, poles and boots out in the room/gym. Some identifying mark (a number on a piece of tape) should be placed in the boots and on the skis for identification purposes. Children will need this to find the skis, poles and boots assigned to them for each lesson.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Matching equipment to children. Match the equipment to children as closely as possible. Record the names of the children and their equipment number/letter on a master copy of your class list.	1) Equipment - It will be difficult to match the correct size equipment to each child. However, a teacher is encouraged to attempt to apply the following principles in matching equipment to children as much as possible. Boots - should fit with two pairs of socks, at least one of which should be a thick wool pair. Skis - should, when stood up vertically beside the child with arms raised above head, come up to the wrists. Poles - should, when stood up vertically beside the child, come up to his/her armpits.

TASKS	TEACHER SUGGESTIONS
2) Waxing principles discussed. Demonstrate to your class the correct waxing procedure. (Note: Skis probably only need to be waxed once every two or three days ..... if the majority of work outdoors occurs in the school yard. Therefore, the staff should consult together concerning the responsibility for waxing.)	2) Waxing Discuss the waxing options. Green wax is for cold weather (-10°C. to -18°C.) conditions and blue is for warmer weather conditions (0°C. to -10°C.) Application - wax is applied liberally and evenly along the camber or middle of ski. Application is done only on dry skis.  Scraping and corking - If wax builds up, cold wax should be scraped off. New wax should be corked on, particularly on the bow of ski, or the camber.
3. Clothing principles discussed. Wear more than "enough" clothing. Clothing can be removed if skier gets too warm. Layer principle - It is better to wear more layers of clothing, than one large bulky layer. Layers can be removed if necessary. Covering extremities - wrists, necks, and ankles are important areas to cover. Turtle necks, long mitts or gloves and a second pair of woolen socks worn over the pants can help here. Clothing type - wool, heavy cotton, and other breathable fabrics are superior to synthetics.	3) Clothing The teacher may find it valuable to "dress the part", or actually demonstrate the principles being discussed. Layer 1 - Lifa, fish net or cotton underwear, cotton socks. Layer 2 - Turtleneck, wool, or flannel shirt, knickers, sweat pants, or loose, stretchy slacks and knee socks. Layer 3 - Heavy sweater, leather or nylon outer mitts with wool inners, toque, gaiters, bellaclava.

Consolidation: Films or film strips are useful motivator at this stage.

Evaluation of Lesson:

LESSON 2

Objective: Exploration - movement exploration on playground without poles.

GRADE FOUR

Overview: This second lesson is designed to have children explore balances, travels and shapes on skis. It is highly exploratory in nature and the teacher needs to present tasks or challenges to the children to help them begin to feel some of the underlying skills in skiing. The philosophy that children should be taught complex skills in the whole part - whole method is the basis for the whole unit on skiing. Exposing children to the whole skill (this lesson) is followed by exposing them to part(s) of the skill in Lessons 3 - 6. In the final lessons, the application, children use cross-country skiing in a functional, whole and practical way by travelling or touring.

Equipment: Cross-country skis, poles, boots.

Introductory Activities:
Skis are brought outside. There, children put them on. Instructions are given regarding the area in which the children will be travelling. Allow 5 - 6 minutes of time for children to get accustomed to the new conditions.

Skill Development:

TASKS

1) Exploration of falling without poles.

Can you fall where you are standing: to your right side... to your left side... behind you?

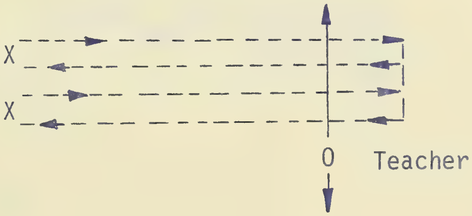
Can you fall these different ways while moving?

2) Exploration of falling with poles.
Repeat the above with poles.

TEACHER SUGGESTIONS

It is suggested that teachers adopt one of the following methods of organizing the children for presentation of the tasks.

Method 1



TASKS

3) Exploration of making shapes without poles.

Can you make a stretched, wide shape? A stretched long shape? A different kind of stretched shape?

4) Exploration of making shapes with poles.

5) Exploration of balances with poles.

Show how you can balance on one ski. Can you balance on the other ski?

Can you balance on one ski at a low level? At a medium level? At a high level?

Can you slide forward and stop, then balance?

6) Exploration of balances with poles.
Repeat the above tasks with poles.

7) Exploration of various locometer travels without poles.

Can you walk on your skis?

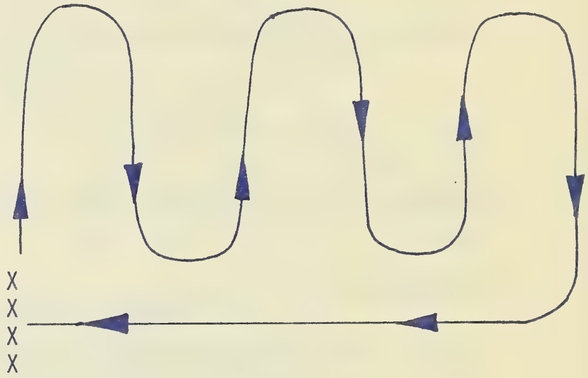
Show the following travels on your skis: hops, jumps (one to two, two to two, two to one) with different landings, runs, slides.

Can you try these travels going to your right ... to your left?

TEACHER SUGGESTIONS

Children line up facing you. They ski to a designated spot 25-35 metres away. Here they turn, and return to their original spot. They create a track that enables them to ski without breaking new trail. The teacher skis as indicated in the diagram. The challenges are issued to children at either end.

Method 2



Children line up behind you and ski along the route indicated in the diagram. The track is created therefore in the figure shown. The teacher can leave the track and transverse it, going in among the children, stopping them when necessary to issue new challenges.

TASKS	TEACHER SUGGESTIONS
8) Exploration of various locometer travels with poles. Repeat the above tasks with poles.	

Consolidation: Time should now be provided for children to explore, with poles on their own. Keep children on the track you have set up.

Evaluation of Lesson:

LESSON 3

Objective: Striding - striding explored without poles.

GRADE FOUR

Overview: The basic travel movement in skiing is the diagonal stride... just as in walking. This lesson is designed to explore this stride and, as well, turns. It is suggested that teachers employ one of the two methods of class organization found in Lesson 2, page 61.

Introductory Activity:
Assemble students. Allow 5 - 6 minutes of travelling along the route. This should be done without poles. The result will be a track(s) in which children can ski unimpeded.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Exploration of diagonal stride without poles. - Can you walk on your track? - Can you walk again but show a little more force or exertion on the walking kick? - Repeat, and progressively increase this force. - Repeat and swing arms loosely and exaggerated a bit ... and bend slightly forward. - Keep your eyes about 10 metres in front of you. - Try to increase the length of the glide a little more each trip on the track.	Children will, at this stage, require only one method of changing direction when they reach the end of the track ..... the step turn. A brief demonstration by the teacher followed by practise by the children is sufficient for now.

The Step Turn

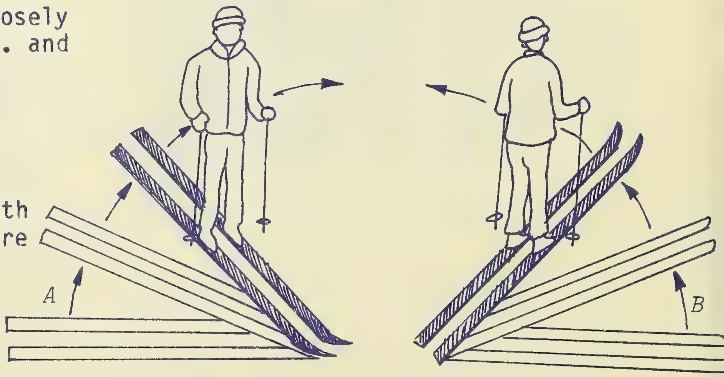
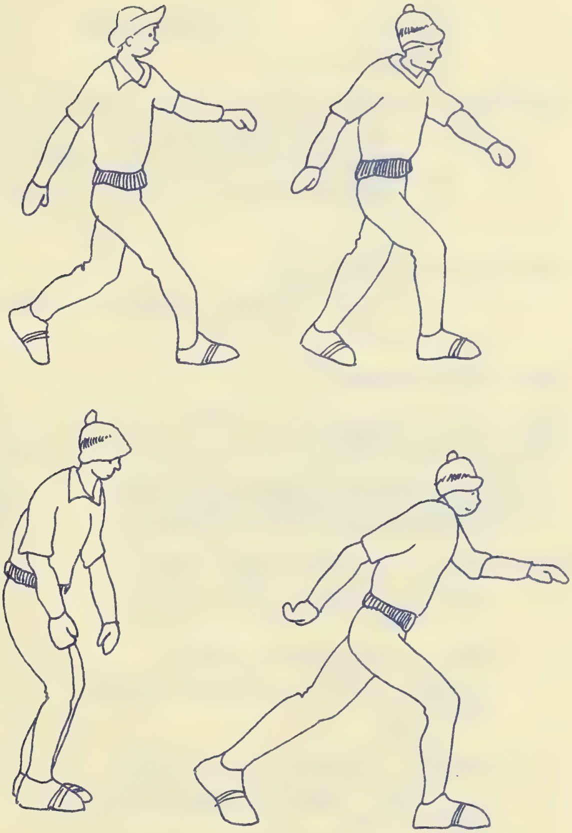


Figure 2 stepping around in place, "A" indica moving the tails of the skis first, one follotes the others; "B" indicates moving the tips. wing

TASKS TEACHER SUGGESTIONS



Consolidation: 1. Monkey Drill - have the children face you .... in scattered formation facing you. Point in the direction you want them to go. They travel in that direction.

2. Simon Says - Children in scattered formation again facing you. Lead the children through the tasks explored in Lesson 1 - (shapes, balances, and travels).

Evaluation of Lesson:

LESSON 4

Objective: Striding - striding explored with poles.

GRADE FOUR

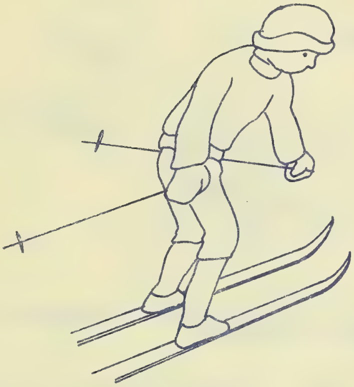
Overview: This lesson is designed to have children explore the basic strides using poles. It is suggested that the diagonal stride be taught with poles first carried .... then used in conjunction with the stride.

Introductory Activity:
3 - 5 minutes skiing on track without poles.

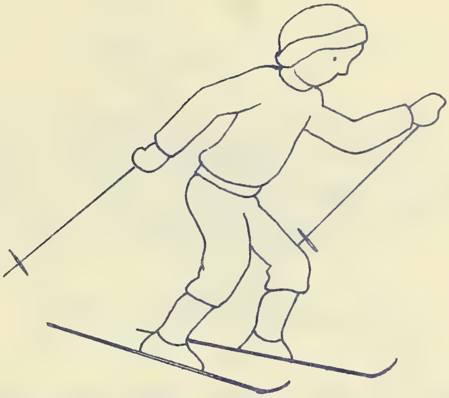
Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Exploration of diagonal stride with poles carried in hands. - Can you walk on your track while carrying your poles? - Can you swing your arms, easily in full extension back and front? - Repeat, practise your glide and thrust down on your kick. Stretch out.	Poles should be held in each hand, halfway up the shaft.
2) Exploration of diagonal stride using poles. - Repeat the above tasks using poles. - Practise. Decrease your number of strides each trip. Try for one less each time.	Poles are primarily used to maintain rhythm and to keep balance. They help little in the actual thrusting forward or glide. In grasping the poles, the hand goes through the loop entirely. Then, the hand closes on the handle and grasps the loop between the hand and pole handle.

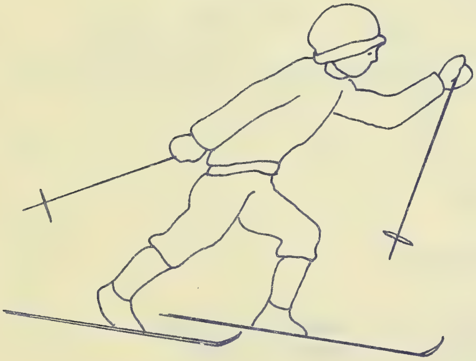
TEACHER SUGGESTIONS (Cont'd)



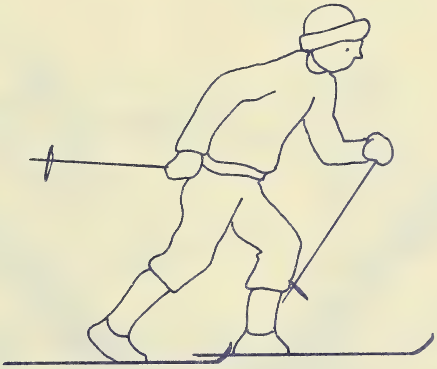
The right leg is even with the left, which is now weighted. With a slight, rapid sinking in its knee, the left leg starts its backward kick. The right arm has started its push just before the left leg's kick.



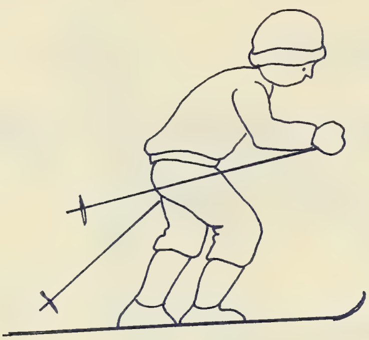
The left leg has almost completed its kick; when a gradual weight shift to the right leg starts. The right arm has finished its pole push. The left arm has almost completed its forward swing.



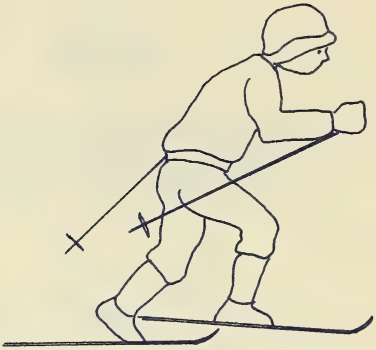
This is gliding: the right leg is now carrying all weight. The right arm has begun to swing forward, and the left pole is just being planted. Note the bend of the gliding knee and ankle.



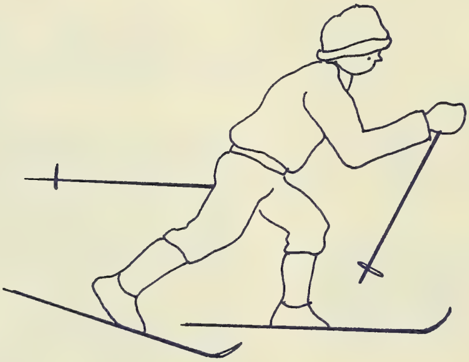
The left leg now swings forward; it is still unweighted. The right arm swings forward, while the left arm exerts downward force on its pole.



The left leg is even with the right, which now is weighted. This phase of the stride is just opposite to that of the first picture. The right leg starts its backward kick and the left arm has started its push.



The right leg has almost completed its kick. This phase of the stride is opposite to that of the second picture. The left arm has almost completed its pole push. The right arm has almost come completely forward.



This is gliding on the left ski, just the opposite phase to the third picture. The left arm has begun to swing forward, and the right pole is just being planted.

Consolidation: School yard trip - A tour of the school yard or playground school now occur.

Evaluation of Lesson:

LESSON 5

Objective: Turns and falls.

GRADE FOUR

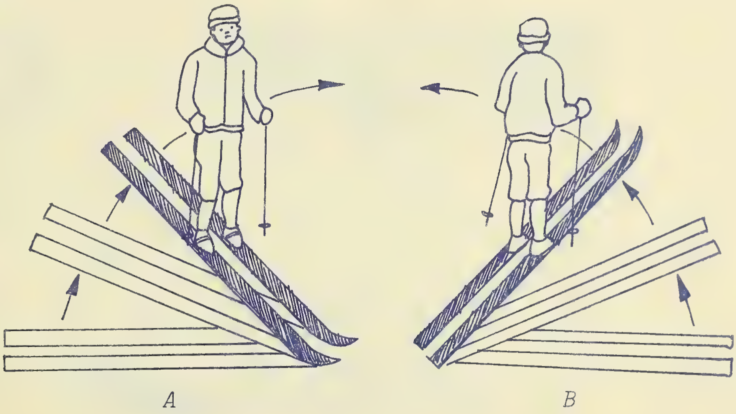
Overview: Skiing conditions along trails etc. present a variety of challenges not found in school yards. Therefore, there is a need for a lesson that focuses on turning while on skis and on falling and rising while on skis. We'll examine three basic methods of turning .... and basic technique in falling.

Equipment: Skis, poles, boots.

Introductory Activity:
Check wax conditions on skis. Shadow activities on skis. One person leads and performs various shapes, balances and travels. A partner follows (see Lesson 2, page 61).

Skill Development:

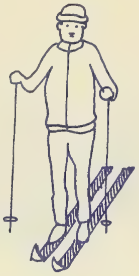
TASKS	TEACHER SUGGESTIONS
1) Exploration of the step-turn. Can you step-turn in both directions? (tips first, then heels)	



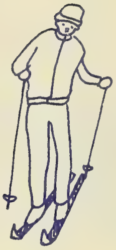
Stepping around in place, "A" indicates moving the tails of the skis first, one following the other; "B" indicates moving the tips.

TEACHER SUGGESTIONS (cont'd)

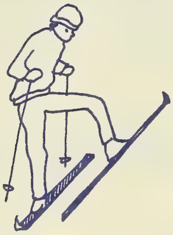
2) Exploration of the kick-turn.



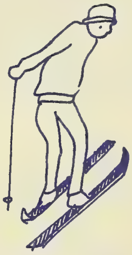
Skis are parallel and equally weighted, poles in front and unweighted.



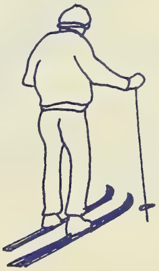
The "inside" pole is planted near the tail of the ski, weight remaining equally distributed on both poles for balance.



The inside ski is kicked up and forward. Pivoting the ski, the tip is brought down in the opposite direction.



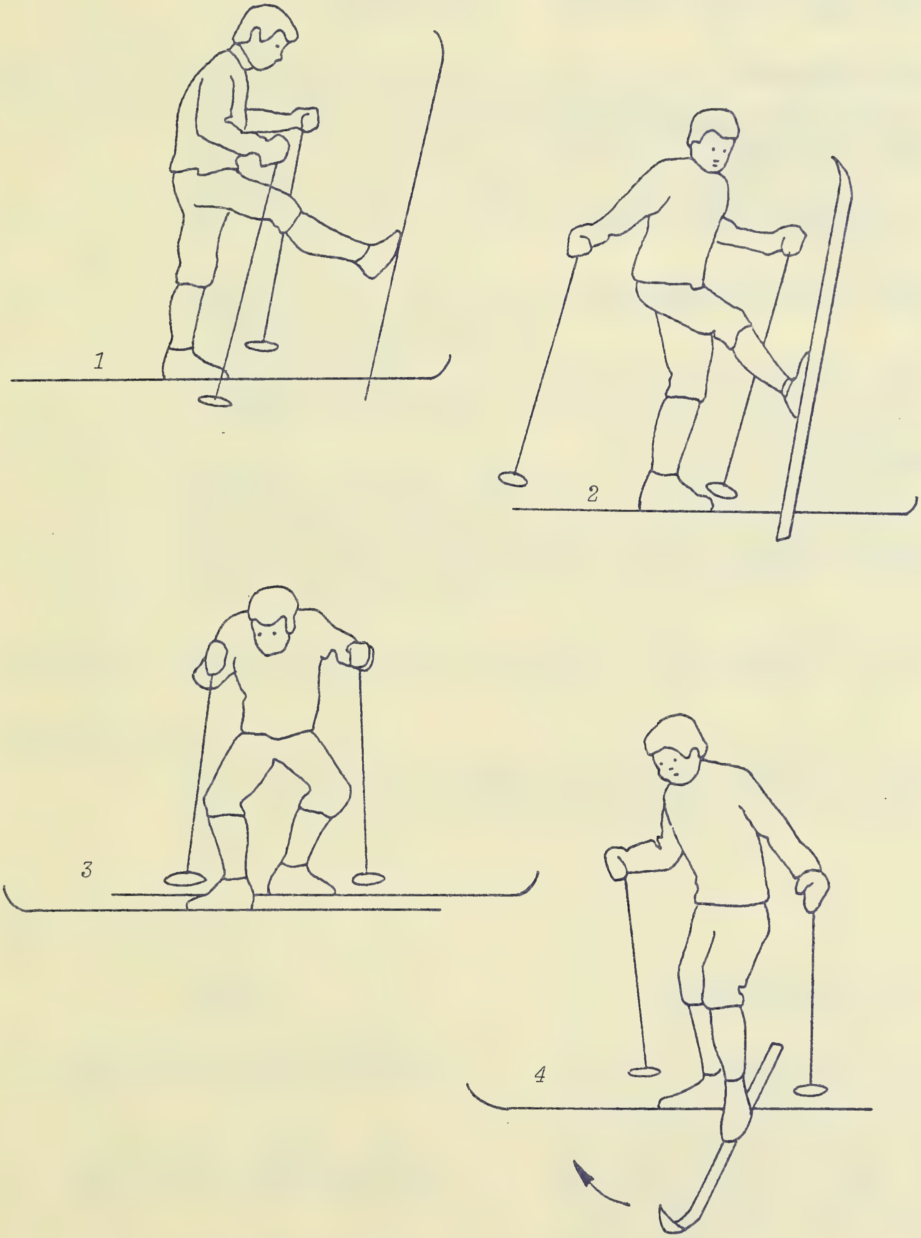
The inside ski is now flat on the snow in the new direction. Weight is transferred to this ski and its pole.



The outside ski and pole are now brought around. This position is now the same as the first but the direction is reversed.

Practise both directions.

THE KICK TURN



TASKS	TEACHER SUGGESTIONS
3) Exploration of falls.	
Can you travel on skis and fall to your right side?	
To your left side?	
Can you fall backwards, sitting between your skis?	
Can you get up without using your poles?	
Can you get up by using your poles?	
Practise falling onto your side hip and get up by rolling onto your back, placing your skis perpendicular.	

Consolidation: School yard tour in pairs.

Evaluation of Lesson:

LESSON 6

Objective: Hills-exploration of travels up and down hills.

GRADE FOUR

Overview: Cross-country skiing hardly ever utilizes a totally level route. Uphill skiing requires changes in technique and methodology. Two main methods of skiing uphill will be examined, direct hill climbing either straight up or at a diagonal, and side stepping up. Two methods of skiing downhill will be examined. Snowplowing and straight running.

Teachers might find it useful for this lesson to simply keep in mind that four aspects will be explored:

- sidestepping up hills
- skiing directly up hills
- snowplowing down hills
- skiing directly down hills

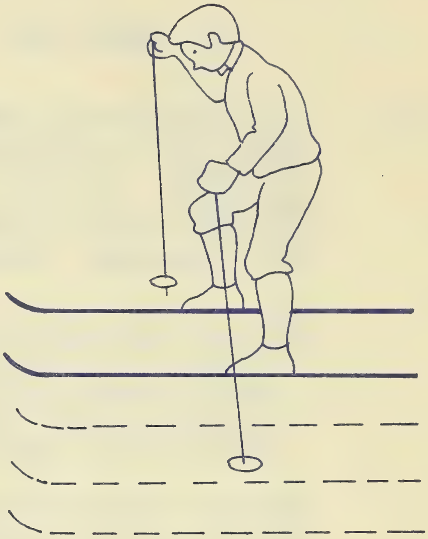
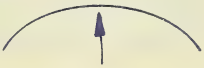
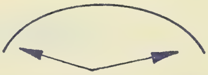
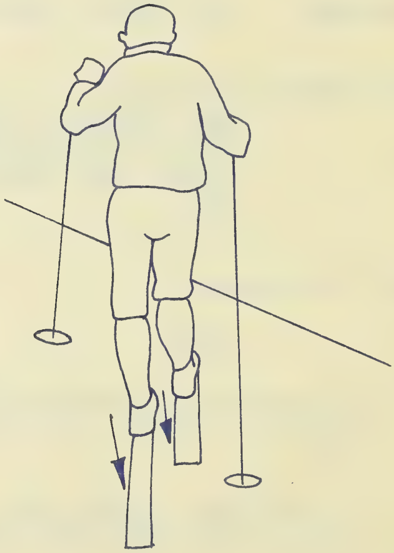
Tasks set in each of the four areas should follow the movement education philosophy initially. Here, questioning techniques are used to help children develop and learn the skills required for the final product. A task card with questions kept in a pocket is useful.

Equipment: Skis, poles, boots, elevations in schoolyard.

Introductory Activity:
Take chldren to an elevated part of the grounds. Space children to ensure safety when falling. Issue the challenge: Climb to the top of the hill and come down in a variety of ways.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Exploration of sidestepping directly up a hill and down a hill. Can you face sideways and travel up the hill/down the hill? Can you turn and face the other way and travel up the hill/down the hill?	The introductory part of the lesson is, by its open-ended nature, designed to have the children experiment and explore the whole skill(s) of going up and down hills. The exploration continues with tasks set by the teacher that lead to the developing of technique and skill.

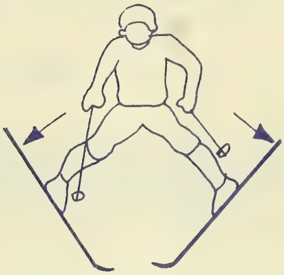
TASKS	TEACHER SUGGESTIONS
Can you travel this way up the hill facing one direction, turn and come down facing the other direction? Travel this way taking large steps/smaller steps.	 Edge the skis into the hill to prevent slipping forward or backward.
2. Exploration of direct hill climbing. Can you face the hill and climb going straight up? Sidestep coming down.  Can you climb straight up at an angle. Sidestep coming down. 	

TASKS

TEACHER SUGGESTIONS

3. Exploration of snowplow technique coming down the hill.

   Can you come down the hill using the snowplow? (Travelling up the hill, using one of the methods practised.)

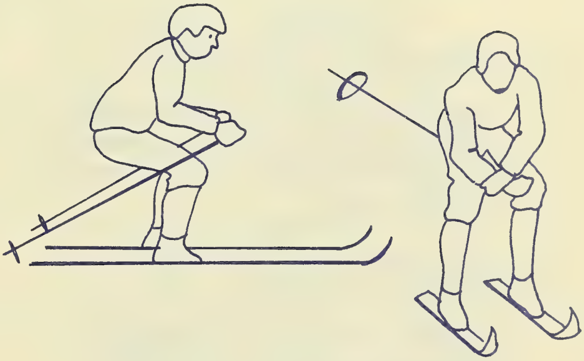


4. Exploration of straight running downhill.

   Keep your skis together, travel downhill.

   Travel downhill while standing tall/while crouching.

   Travel downhill with one ski in front.



The hill used should at first be no more than one to two meters high. Gradually increase the height students explore on.

Consolidation: Practise.

Evaluation of Lesson:

LESSON 7

Objective: Review of hill work. (see Lesson 6, page 73).

GRADE FOUR

Overview: Lesson 6 provided a foundation for skiing hills. This lesson is both a review and an extension of the work covered in that lesson.

Equipment: Skis, poles, boots, hill(s).

Introductory Activity:
Hill exploration activities (review of last days work).

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Copying activities in pairs. One person travel up the hill. The partner watches .... then copies the travel up. Repeat coming down.	
2) Individual work with children - one to one basis. (While children are working in pairs, the teacher can work on an individual basis with children who require assistance).	

Consolidation: Practise.

Evaluation of Lesson:

LESSON 8 & 9

Objective: Touring - schoolyard and beyond.

GRADE FOUR

Overview: Opportunities to explore untried, and perhaps more difficult terrain, is a worthwhile application of the skills learned previously. Parks, canyons, or trails along the river can be used.

Equipment: Skis, poles, boots and teacher supplies.

Introductory Activity:
Preparation for trip, discussion of proper clothing, behaviour and of procedures while on the tour.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Assemble children at the location. Assign children to adult leaders. Set off on the trail.	It is strongly recommended that teachers follow the suggestions listed below in their organization and carrying out of the tour. 1. Get adult assistance. A ratio of 8 children to 1 adult is desired. Parents, or members of local ski clubs may assist. 2. Prepare children by reviewing principles of proper dress for winter activities (see lesson page 60). 3. Teachers should review general first aid procedures. They should carry a soft pack (backpack) in which the following items need to be included: - matches (in plastic bag) - jackknife - nylon cord or string (2 meters) - ski tip replacement (if wood skis are used) - cans of green and blue wax, scraper and cork - first aid kit

Evaluation of Lesson:

LESSON 10

Objective: Orienteering

GRADE FOUR

Overview: An interesting way of applying skills learned in the cross-country skiing unit is through orienteering. An orienteering course can be set up in the school yard.

Equipment: Skis, poles and boots. Score sheets, pencils and cardboard/manilla tag cards with letters of alphabet written in felt markings.

Introductory Activity:
Teacher(s) select 10 control points. Place the cardboard/manilla tag cards at these points. Record on your master control sheet the location of the cards.

Assemble students. Explain the procedure to be followed. Assign an arbitrary time limit, a whistle will indicate when students should return.

Distribute score sheets and pencils. Students are to record the letter from the card into the appropriate place on their score sheet.

Skill Development:

TASKS | TEACHER SUGGESTIONS

Sample score sheet might be devised as follows:

Name ______________________ Time ________________

No.	Code Letter	Value	Control Description
1		10	north corner of block
2		10	"swinging" (swing set)
3		10	southwest corner of school
4		15	tallest tree on school yard
5		15	goal posts
6		5	office window
7		5	tetherpool
8		10	skating rink fence
9		10	school sign
10		15	teeter totters

Students place their letter found on the card in the appropriate place in the second column.

Consolidation: Return and total points.

LESSON 1

Objective: Introduction to skis - waxing, skis and poles, clothing, and organization.

GRADE FIVE

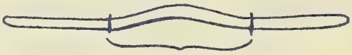
Overview: This initial lesson is to be done in the classroom. The lesson is designed for the purpose of organizing the children for skiing, matching skis and boots to children, discussion of waxing, and a lecture on proper clothing. This lesson should occur in the room or gym where the skis will later be distributed each ski lesson.

Equipment: Cross-country skis, poles, boots.

Introductory Activity:
Setting the skis, poles and boots out in the room/gym. Some identifying mark (a number on a piece of tape) should be placed in the boots and on the skis for identification purposes. Children will need this to find the skis, poles and boots assigned to them today and on subsequent days.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Matching equipment to children. Match the equipment to children as closely as possible. Record the names of the children and their equipment number/letter on a master copy of your class list.	1) Equipment - It will be difficult to match the correct size equipment to each child. However, a teacher is encouraged to attempt to apply the following principles in matching equipment to children as much as possible. Boots - should fit with two pairs of socks, at least one of which should be a thick wool pair. Skis - should, when stood up vertically beside the child with arms raised above head, come up to the wrists. Poles - should, when stood up vertically beside the child, come up to his/her armpits.

TASKS	TEACHER SUGGESTIONS
2) Discuss waxing principles. Demonstrate to your class the correct waxing procedure. (Note: Skis probably only need to be waxed once every two or three days ..... if the majority of work outdoors occurs in the school yard. The staff should consult together concerning assignment of responsibility for waxing.)	2) Waxing Discuss the waxing options. Green wax is for cold weather (-10°C. to -18°C.) conditions and blue is for warmer weather conditions (0°C. to -10°C.) Application - wax is applied liberally and evenly along the camber or middle of ski. Application is done only on dry skis.  Scraping and corking - If wax builds up, cold wax should be scraped off. New wax should be corked on, particularly on the bow of ski, or the camber.
3. Clothing principles discussed. Wear more than "enough" clothing. Clothing can be removed if skier gets too warm. Layer principle - It is better to wear more layers of clothing, than one large bulky layer. Layers can be removed if necessary. Covering extremities - wrists, necks, and ankles are important areas to cover. Turtle necks, long mitts or gloves and a second pair of woolen socks worn over the pants can help here. Clothing type - wool, heavy cotton, and other breathable fabrics are superior to synthetics.	3) Clothing The teacher may find it valuable to "dress the part", or actually demonstrate the principles being discussed. Layer 1 - Lifa, fish net or cotton underwear, cotton socks. Layer 2 - Turtleneck, wool, or flannel shirt, knickers, sweat pants, or loose, stretchy slacks and knee socks. Layer 3 - Heavy sweater, leather or nylon outer mitts with wool inners, toque, gaiters, bellaclava.

Consolidation: Films or film strips are useful motivator at this stage.

Evaluation of Lesson:

LESSON 2

Objective: Exploration - movement exploration on playground without poles.

GRADE FIVE

Overview: This second lesson is designed to have children explore balances, travels and shapes on skis. It is highly exploratory in nature and the teacher needs to present tasks or challenges to the children to help them begin to feel some of the underlying skills in skiing. The philosophy that children should be taught complex skills in the whole part - whole method is the basis for the whole unit on skiing. Exposing children to the whole skill (this lesson) is followed by exposing them to part(s) of the skill in Lessons 3 - 6. In the final lessons, the application, children use cross- country skiing in a functional, whole and practical way by travelling or touring.

Equipment: Cross-country skis, poles, boots.

Introductory Activities:
Skis are brought outside. There, children put them on. Instructions are given regarding the area in which the children will travel. Allow 5 - 6 minutes of time for children to get accustomed to the new conditions.

Skill Development:

TASKS

1) Exploration of falling without poles.

Can you fall where you are standing to your right side? To your left? Behind you?

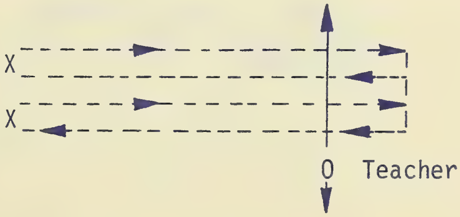
Can you fall these different ways while moving?

2) Exploration of falling with poles.
Repeat the above with poles.

TEACHER SUGGESTIONS

It is suggested that teachers adopt one of the following methods of organizing the children for presentation of the tasks.

Method 1



TASKS

3) Exploration of making shapes without poles.

Can you make a stretched, wide shape? A stretched long shape? A different kind of stretched shape?

4) Exploration of making shapes with poles.

5) Exploration of balances with poles.

Show how you can balance on one ski. Can you balance on the other ski?

Can you balance on one ski at a low level? At a medium level? At a high level?

Can you slide forward and stop, then balance?

6) Exploration of balances with poles.
Repeat the above tasks with poles.

7) Exploration of various locometer travels without poles.

Can you walk on your skis?

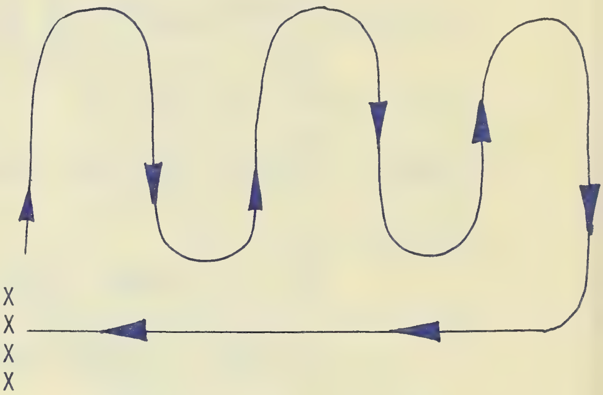
Show the following travels on your skis: hops, jumps (one to two, two to two, two to one) with different landings, runs, slides.

Can you try these travels going to your right ... to your left?

TEACHER SUGGESTIONS

Children line up facing you. They ski to a designated spot 25-35 metres away. Here they turn, and return to their original spot. They create a track that enables them to ski without breaking new trail. The teacher skis as indicated in the diagram. The challenges are issued to children at either end.

Method 2



Children line up behind you and ski along the route indicated in the diagram. The track is created therefore in the figure shown. The teacher can leave the track and transverse it, going in among the children, stopping them when necessary to issue new challenges.

TASKS	TEACHER SUGGESTIONS
8) Exploration of various locometer travels with poles. Repeat the above tasks with poles.	

Consolidation: Time should now be provided for children to explore, with poles on their own. Keep children on the track you have set up.

Evaluation of Lesson:

LESSON 3

Objective: Striding - striding explored without poles.

GRADE FIVE

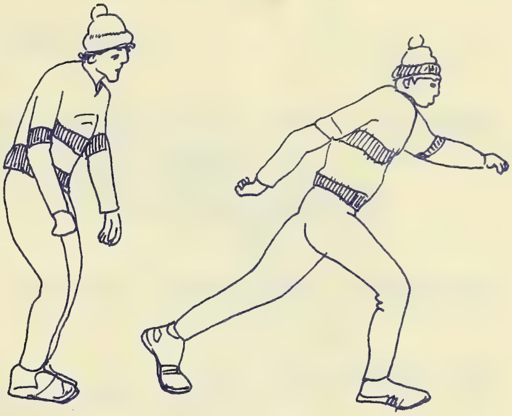
Overview: The term "diagonal stride" means simply travelling on skis using arms and legs the same as in walking. The learning of the stride is best facilitated initially by starting with ordinary walking on skis, then progressing to shuffling on skis, where a slide is used.

Equipment: Skis, poles and boots.

Skill Development:

TASKS	TEACHER SUGGESTIONS
Five minutes exploratory travel on skis with poles.	It is suggested that teachers adopt either Method 1 or 2 for organizing the class for instruction (see Lesson 2, page 81). It is important that children have a track on which to work.
1) Exploration of walking on skis without poles. - Can you walk on the track, swinging arms loosely, lifting skis slightly? (2 - 3 trips up and down track)	
- Can you shuffle ... that is add a slide? (2 - 3 trips)	The aim is an achievement of a fluid motion where the exchange of weight from one ski to the other occurs with proper timing.
- Can you extend your arms forward and back? While walking?	
2) Exploration of the diagonal stride without poles. - Can you extend the time you spend on the one ski? - Can you practise extending your free leg out behind you? - Try to "punch down" with the leg on which you are gliding! (2 or 3 travels)	

TASKS	TEACHER SUGGESTIONS
- Travel along your track and count your number of strides. Repeat, now trying to reduce your number of glides by one each trip.	When children come to the end of the track, they may turn around using, for now, any method they wish!



Consolidation: Ski hike - take your students along a trail in your school yard. This allows them opportunity to apply the skills practised today.

Evaluation:

LESSON 4

Objective: Striding - striding explored with poles.

GRADE FIVE

Overview: This lesson explores the basic strides using poles. It reviews the diagonal stride and introduces a parallel stride (referred to as double poling). Poles serve primarily to maintain rhythm and assist balance.

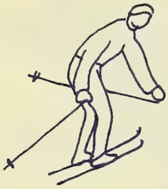
Equipment: Skis, poles and boots.

Introductory Activity:
Five minutes travelling on skis (with poles). Exploration and experimentation on the tracks.

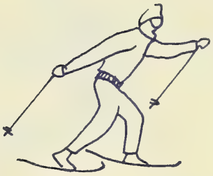
Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Exploration of diagonal stride while carrying poles.	Poles should be held halfway up the shaft.
- Can you stride on your skis, swinging arms loosely. (Keep baskets behind you and pointed down).	
- Repeat, concentrate on lengthening your stride and thrusting down hard on your kick.	
2) Exploration of diagonal stride using poles.	
- Practise your stride, using your poles. (2 or 3 trips)	
- Stay loose, and concentrate on a flowing, coordinated movement .... as with an exaggerated walk (2 or 3 trips).	
- Keep your arms fully extended (one forward and one back). Plant your basket near the boot toe of the lead ski. (2 or 3 trips)	

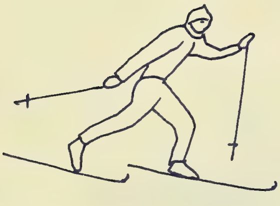
TEACHER SUGGESTIONS (Cont'd)



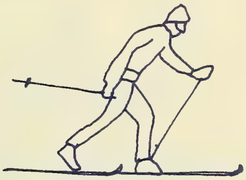
The right leg is even with the left, which is now weighted. With a slight, rapid sinking in its knee, the left leg starts its backward kick. The right arm has started its push just before the left leg's kick.



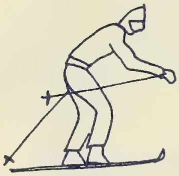
The left leg has almost completed its kick; when a gradual weight shift to the right leg starts. The right arm has finished its pole push. The left arm has almost completed its forward swing.



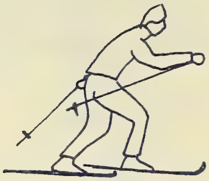
This is gliding: the right leg is now carrying all weight. The right arm has begun to swing forward, and the left pole is just being planted. Note the bend of the gliding knee and ankle.



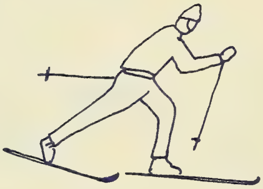
The left leg now swings forward; it is still unweighted. The right arm swings forward, while the left arm exerts downward force on its pole.



The left leg is even with the right, which now is weighted. This phase of the stride is just opposite to that of the first picture. The right leg starts its backward kick and the left arm has started its push.



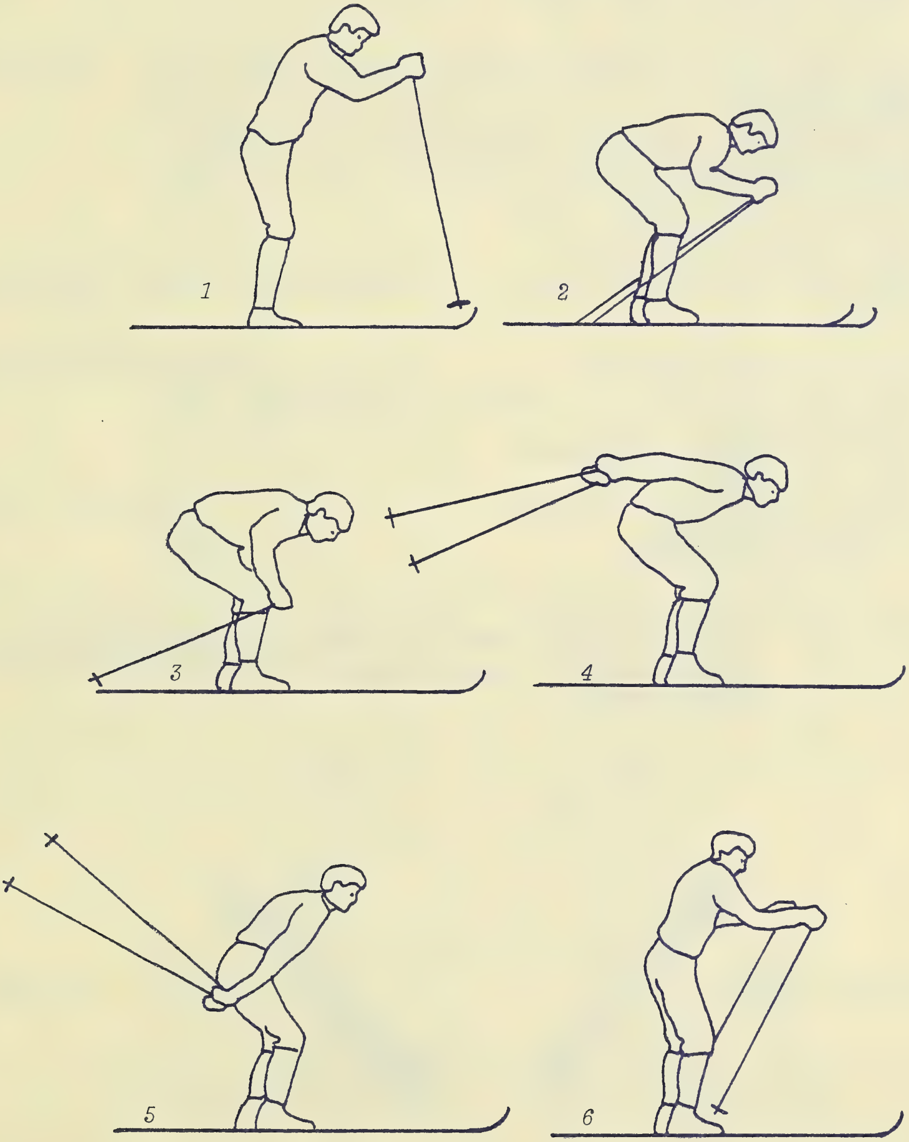
The right leg has almost completed its kick. This phase of the stride is opposite to that of the second picture. The left arm has almost completed its pole push. The right arm has almost come completely forward.



This is gliding on the left ski, just the opposite phase to the third picture. The left arm has begun to swing forward, and the right pole is just being planted.

TEACHER SUGGESTIONS (Cont'd)

DOUBLE POLING



Do not bend the head and shoulders too low during the maximum pushing phase (2) and (3).

TASKS

TEACHER SUGGESTIONS

3) Exploration of double poling.

- Can you travel on your track while double poling?

Double Poling

Double poling is a way of resting while running, as a change from the diagonal stride. Double poling is useful on slight declines to maintain speed, yet it allows the skier to relax.

Keeping the skis parallel, push with both poles simultaneously and glide, letting the poles trail behind you. Then plant the poles forward again and push as the skis glide past them.

Consolidation: School yard hike. Children should explore the school yard on skis, either in tour formation (one behind another) or independently.

LESSON 5

Objective: Turns and falls.

GRADE FIVE

Overview: This lesson presents teaching suggestions and activities that enable children to become more mobile on skis (turns) and for children to learn how to fall and rise. There are numerous occasions in both "playground" and trail skiing where the mystery of these techniques is vital. Three turns will be explored.

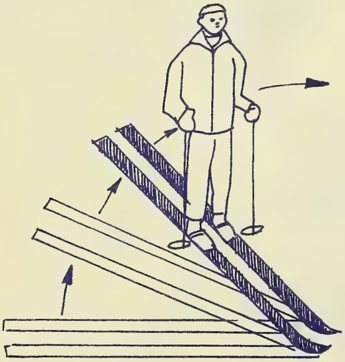
Equipment: Skis, poles and boots.

Introductory Activity:
Check wax conditions on skis.
Shadow activities.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Exploration of step turn moving the tails of the ski first. See diagram A.	Step-turns used on level or slightly inclined ground.
2) Exploration of step-turn moving tips first. See diagram B.	

Diagram A



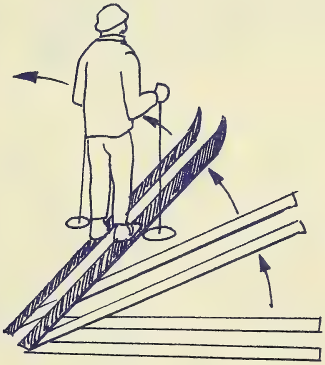
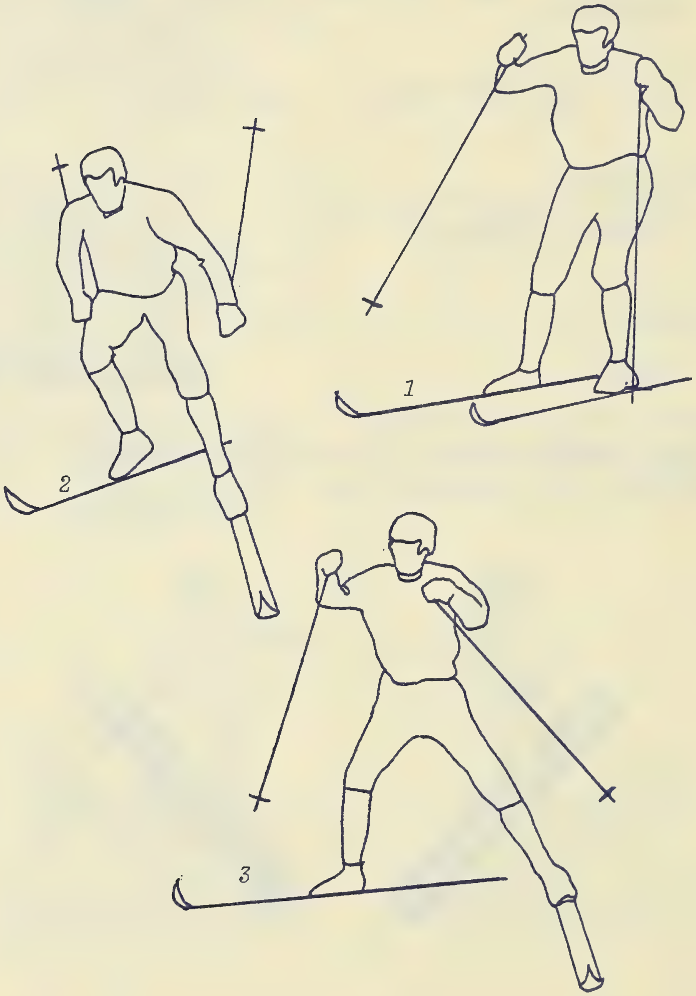


Diagram B

TASKS	TEACHER SUGGESTIONS
3) Exploration of step-around turn. Can you step around while in place? Can you slide ... and do the step around turn?	The step-around turn is simply moving alternate skis one at a time gradually changing directions. It is basically the step-turn done while sliding.

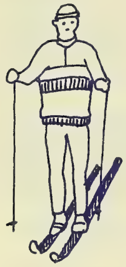
THE STEP-AROUND TURN



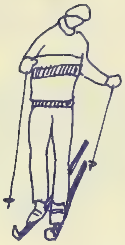
4) Exploration of kick-turns.

Can you perform the kick turn in both directions?

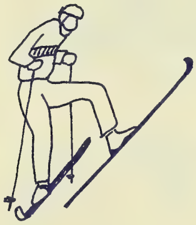
TEACHER SUGGESTIONS (cont'd)



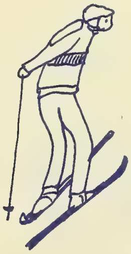
Skis are parallel and equally weighted, poles in front and unweighted.



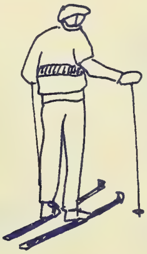
The "inside" pole is planted near the tail of the ski, weight remaining equally distributed on both poles for balance.



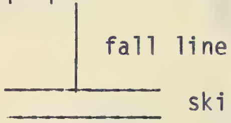
The inside ski is kicked up and forward. Pivoting the ski, the tip is brought down in the opposite direction.

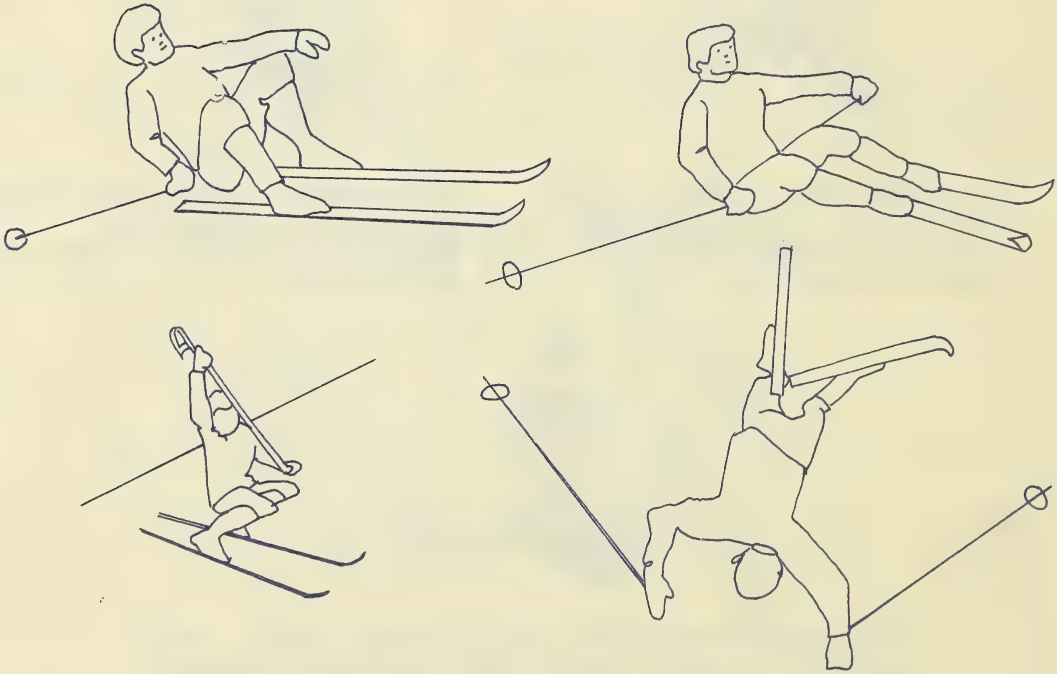


The inside ski is now flat on the snow in the new direction. Weight is transferred to this ski and its pole.



The outside ski and pole are now brought around. This position is now the same as the first but the direction is reversed.

TASKS	TEACHER SUGGESTIONS
5) Exploration of falls. In place, can you fall behind? To the left side? To the right side?	Three accepted ways of falling: - sitting down between one's skis - falling to one side - pitching forward onto one's face (not suggested here for practice)
Travel on your track and fall behind ... and to both sides?	Falling onto your side requires rolling backward, placing skis perpendicular to the fall line.
Can you fall and rise without poles? Can you fall and rise with poles?	
Practise falling and getting up by rolling onto your back.	Then, the skier should move the center of gravity over the skis to rise. The poles should be used more for stability than for pushing one's self up. (see diagrams below)



Consolidation: School yard trek in pairs.

Evaluation of Lesson:

LESSON 6

Objective: Hills - exploration of travels up and down hills.

GRADE FIVE

Overview: Cross-country skiing requires skills in both uphill and downhill skiing. This lesson is designed to explore three methods of travelling uphill, sidestepping, direct (traversing) and herringbone! It will explore three methods of skiing downhill: straight running, snow plowing, and turning.

The teaching methodology suggested follows the movement education philosophy used throughout the program. Initial work will be exploratory in nature. Teachers then set tasks that lead the children to develop skills in each of the six aspects covered in this lesson. They are:

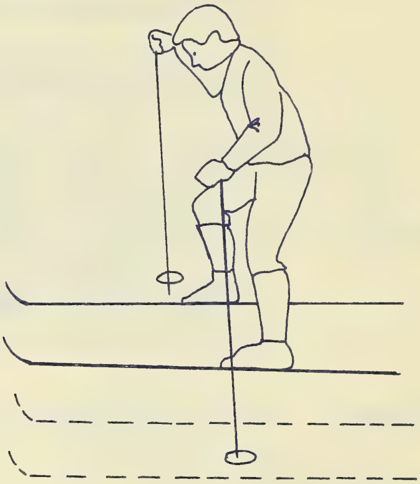
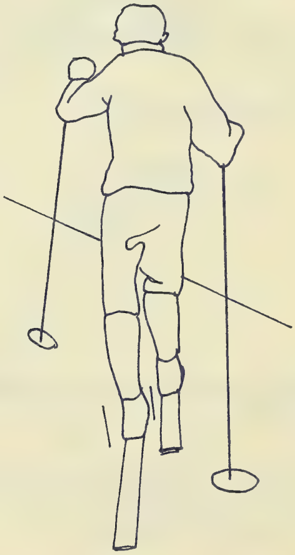
1. Sidestepping uphill
2. Direct skiing uphill (traversing)
3. Herringbone uphill
4. Straight skiing downhill
5. Snowplowing downhill
6. Turning while skiing downhill.

Equipment: Skis, poles, boots, elevated ground.

Introductory Activity:
Exploration of hills. Set the task: Show ways of going up and coming down the hill.

Skill Development:

TASKS	TEACHER SUGGESTIONS
	The initial task (in the Introductory Activities) above gives children a chance to explore the hill and ways of negotiating it on their own.
1) Exploration of sidestepping uphill.	Proper spacing of the children is important.
Can you sidestep up the hill facing one direction? Then facing the other?	Children will have explored sidestepping, traversing, straight running and snowplowing in grades 3 and 4. A brief review might be sufficient here.
Can you take large steps? small steps?	

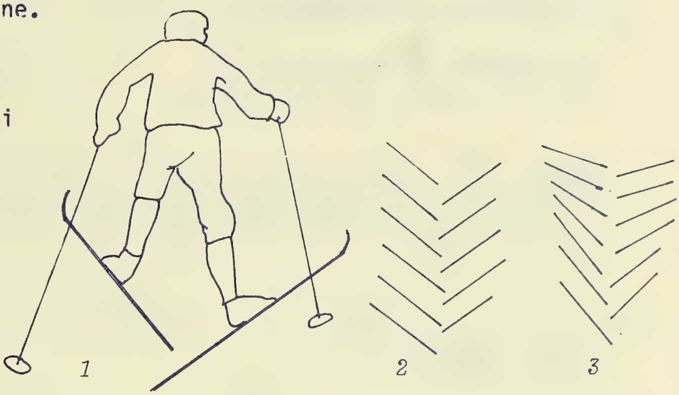
TASKS	TEACHER SUGGESTIONS
How quickly can you sidestep up? Can you hop while stepping up the hill? Can you sidestep travel up at an angle? (Children can ski down directly.)	The elevation used can increase as the children's skills improve. Initially, 2 - 3 metres is sufficient. A school yard provides enough rises and elevations to ensure challenging work. 
2) Exploration of direct skiing uphill. Can you ski directly up the hill? Can you run on your skis up the hill? Can you take long strides up the hill? How might you reach a point on the hill over to your right? To your left? Can you combine a sidestep with direct uphill climbing?	

TASKS

3) Exploration of herringbone.

Travel directly uphill. Gradually increase the distance between your ski tips.

TEACHER SUGGESTIONS



1. Proper position.
2. Tracks left on uniform hill.
3. Tracks left on hill which gets steeper.

If children experience difficulties remaining erect when travelling downhill, a review of Lesson 2, page 95 (balances) on skis is suggested.

4) Exploration of straight running downhill.

Find a place on the hillside. Balance on one ski. Then the other ski.

Place one ski in front of the other - balance there.

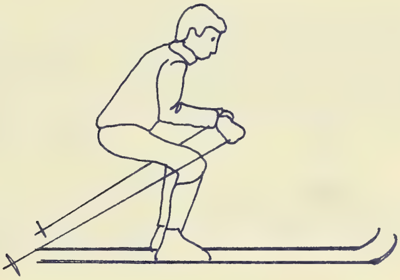
Crouch back - balance there.

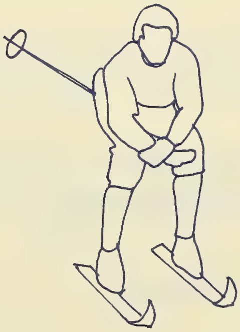
Climb the hill, ski directly down. Place one ski in front of the other.

Can you get the other ski in front?

How low can you be when coming downhill?

Can you stop before reaching the bottom?



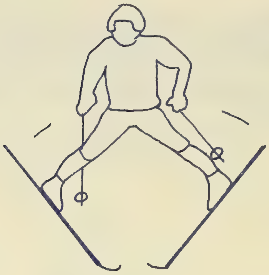


TASKS

TEACHER SUGGESTIONS

5) Exploration of snowplowing.

Ski downhill, move your tips closer together gradually.

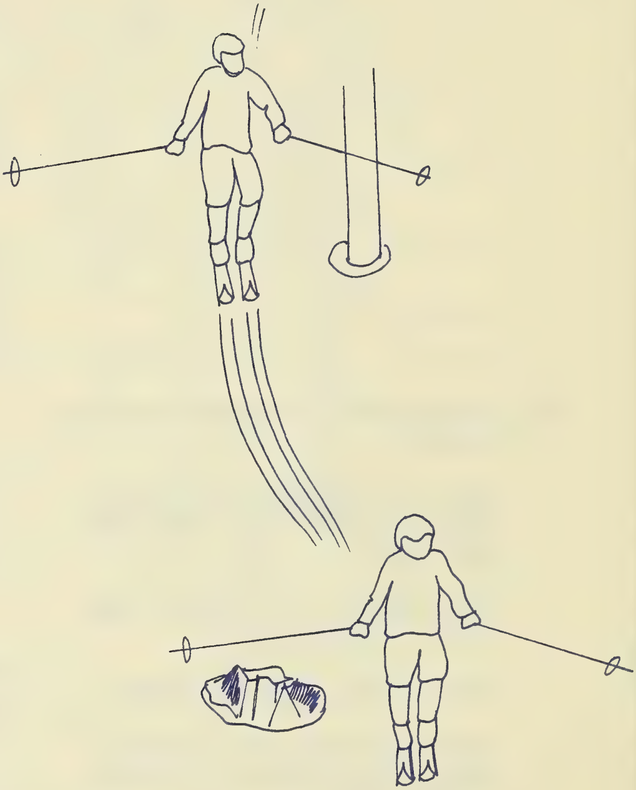


6) Exploration of turns when skiing downhill.

Can you ski down hill with most weight on one ski? The other?

Can you ski down hill and lift one ski to the left? To the right?

Repeat - take shorter steps and lean back on your heels.



Consolidation: Practise.

Evaluation of Lesson:

LESSON 7

Objective: Review of hill work. (see Lesson 6, page 81).

GRADE FIVE

Overview: Children have explored skiing while on hills. This lesson, an extension, of the work done in Lesson 6, is designed to provide challenges beyond those encountered last lesson.

Equipment: Skis, poles, boots, hill(s).

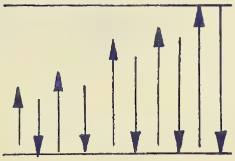
Introductory Activity:
Copying activities. In pairs, well spaced and one at a time, have children copy the travels up and down the hill of their partner.

Skill Development:

TASKS	TEACHER SUGGESTIONS
Review of techniques explored in Lesson 6.	This lesson is designed to afford the teacher opportunities to work with individual students. The teacher may issue the general task of: "Practise going up and down the hill using, at least once, each of the techniques practised last day". Then, by moving from student to student, the teacher can encourage and instruct.

Consolidation: a) Relay races.
In pairs, apart at a distance of 20 - 30 metres, have children count how many times they can change places in a specified time.

b) Lightning - children travel up to designated points, turn, and return to starting spot. Repeat, travel up to a point beyond the first. Return ... etc...



LESSON 8 & 9

Objective: Touring - schoolyard and beyond.

GRADE FIVE

Overview: Opportunities to explore untried, and perhaps more difficult terrain, is a worthwhile application of the skills learned previously. Parks, canyons, or trails along a river may be used.

Equipment: Skis, poles, boots and teacher supplies.

Introductory Activity:
Preparation for trip, discussion of proper clothing, behaviour and of procedures while on the tour.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Assemble children at the location. Assign children to adult leaders. Set off on the trail.	It is strongly recommended that teachers follow the suggestions listed below in their organization and carrying out of the tour. 1. Get adult assistance. A ratio of 8 children to 1 adult is desired. Parents, or members of local ski clubs may assist. 2. Prepare children by reviewing principles of proper dress for winter activities (see lesson I page 80). 3. Teachers should review general first aid procedures. They should carry a soft pack (backpack) in which the following items need to be included: - matches (in plastic bag) - jacknife - nylon cord or string (2 meters) - ski tip replacement (if wood skis are used) - cans of green and blue wax, scraper and cork

Evaluation of Lesson:

LESSON 10

Objective: Orienteering

GRADE FIVE

Overview: A challenging application of skills learned in the cross-country skiing unit is through orienteering. Simply, score orienteering is the following of written clues to designated places. Here, a marking or letter is placed, and children record that letter on a personal score card. Maps can be used, but are not necessary.

Equipment: Skis, poles, boots, map (optional) and score card.

Introductory Activity:

1) Teacher marks check points out in the schoolyard, park, etc. The mark used at each checkpoint can be letters (A, B, C, etc.) or geometric figures (O, △, □, ▯ etc.)

2) The marks are recorded on a master sheet. Students receive a word description sheet and/or a map (see teaching suggestions, page 102).

3) Students are to read their word description sheet, set off at the same time, and locate as many of the checkpoints as possible within your designated time limit.

4) Students record on their chart, the letter or marking found at the points.

Skill Development:

TASKS | TEACHER SUGGESTIONS

Set out, return at a given signal.

No.	Description of Landmark (Checkpt.)	Value	Insert Code Letter
1	On the east end of softball backstop	15	T
2	On the north side of flower garden	10	B
3	On the south goalpost of field B	5	C
4	On the northwest side of an old stump	10	F
5	At the northeast end of the softball stands	15	R
6	On the bench near three pine trees	15	U
7	On the southwest side of field A	10	A
8	On the west corner of statue	25	Y

Total points __________
Penalty points __________
Final score __________

Consolidation: Total points amassed.

Evaluation of Lesson:

LESSON 1

Objective: Introduction to skis - waxing, skis and poles, clothing, and organization.

GRADE SIX

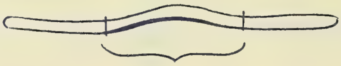
Overview: This initial lesson is to be done in the classroom. The lesson is designed for the purpose of organizing the children for skiing, matching skis and boots to children, discussion of waxing, and a lecture on proper clothing. This lesson should occur in the room or gym where the skis will later be distributed every ski lesson.

Equipment: Cross-country skis, poles, boots.

Introductory Activity:
Setting the skis, poles and boots out in the room/gym. Some identifying mark (a number on a piece of tape) should be placed in the boots and on the skis for identification purposes. Children will need this to find the skis, poles and boots assigned to them today and on subsequent days.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Matching equipment to children. Match the equipment to children as closely as possible. Record the names of the children and their equipment number/letter on a master copy of your class list.	1) Equipment - It will be difficult to match the correct size equipment to each child. However, a teacher is encouraged to attempt to apply the following principles in matching equipment to children as much as possible. Boots - should fit with two pairs of socks, at least one of which should be a thick wool pair. Skis - should, when stood up vertically beside the child with arms raised above head, come up to the wrists. Poles - should, when stood up vertically beside the child, come up to his/her armpits.

TASKS	TEACHER SUGGESTIONS
2) Discuss waxing principles. Demonstrate to your class the correct waxing procedure. (Note: Skis probably only need to be waxed once every two or three days ..... if the majority of work outdoors occurs in the school yard. The staff should consult together concerning assignment of responsibility for waxing.)	2) Waxing Discuss the waxing options. Green wax is for cold weather (-10°C. to -18°C.) conditions and blue is for warmer weather conditions (0°C. to -10°C.) Application - wax is applied liberally and evenly along the camber or middle of ski. Application is done only on dry skis.  Scraping and corking - If wax builds up, cold wax should be scraped off. New wax should be corked on, particularly on the bow of ski, or the camber.
3. Clothing principles discussed. Wear more than "enough" clothing. Clothing can be removed if skier gets too warm. Layer principle - It is better to wear more layers of clothing, than one large bulky layer. Layers can be removed if necessary. Covering extremities - wrists, necks, and ankles are important areas to cover. Turtle necks, long mitts or gloves and a second pair of woolen socks worn over the pants can help here. Clothing type - wool, heavy cotton, and other breathable fabrics are superior to synthetics.	3) Clothing The teacher may find it valuable to "dress the part", or actually demonstrate the principles being discussed. Layer 1 - Lifa, fish net or cotton underwear, cotton socks. Layer 2 - Turtleneck, wool, or flannel shirt, knickers, sweat pants, or loose, stretchy slacks and knee socks. Layer 3 - Heavy sweater, leather or nylon outer mitts with wool inners, toque, gaiters, bellaclava.

Consolidation: Films or film strips are useful motivator at this stage.

Evaluation of Lesson:

LESSON 2

Objective: Exploration - movement exploration on playground without poles.

GRADE SIX

Overview: This second lesson is designed to have children explore balances, travels and shapes on skis. It is highly exploratory in nature and the teacher needs to present tasks or challenges to the children to help them begin to feel some of the underlying skills in skiing. The philosophy that children should be taught complex skills in the whole part - whole method is the basis for the whole unit on skiing. Exposing children to the whole skill (this lesson) is followed by exposing them to part(s) of the skill in Lessons 3 - 6. In the final lessons, the application, children use cross- country skiing in a functional, whole and practical way by travelling or touring.

Equipment: Cross-country skis, poles, boots.

Introductory Activities:
Skis are brought outside. There, children put them on. Instructions are given regarding the area in which children will travel. Allow 5 - 6 minutes of time for children to get accustomed to the new conditions.

Skill Development:

TASKS

1) Exploration of falling without poles.

Can you fall where you are standing to your right side? To your left? Behind you?

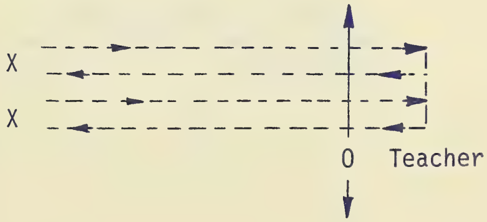
Can you fall these different ways while moving?

2) Exploration of falling with poles.
Repeat the above with poles.

TEACHER SUGGESTIONS

It is suggested that teachers adopt one of the following methods of organizing the children for presentation of the tasks.

Method 1



TASKS

3) Exploration of making shapes without poles.

Can you make a stretched, wide shape? A stretched long shape? A different kind of stretched shape?

4) Exploration of making shapes with poles.

5) Exploration of balances with poles.

Show how you can balance on one ski. Can you balance on the other ski?

Can you balance on one ski at a low level? At a medium level? At a high level?

Can you slide forward and stop, then balance?

6) Exploration of balances with poles.
Repeat the above tasks with poles.

7) Exploration of various locometer travels without poles.

Can you walk on your skis?

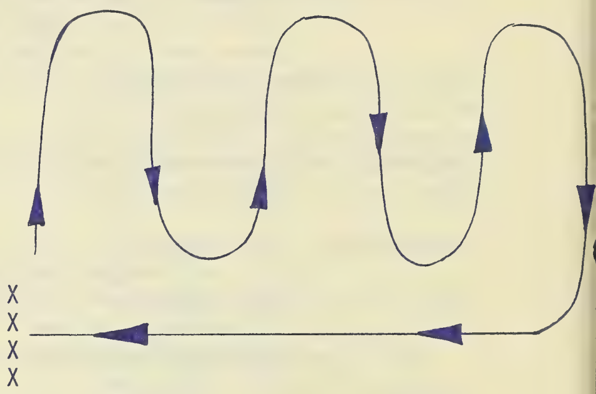
Show the following travels on your skis: hops, jumps (one to two, two to two, two to one) with different landings, runs, slides.

Can you try these travels going to your right ... to your left?

TEACHER SUGGESTIONS

Children line up facing you. They ski to a designated spot 25-35 metres away. Here they turn, and return to their original spot. They create a track that enables them to ski without breaking new trail. The teacher skis as indicated in the diagram. The challenges are issued to children at either end.

Method 2



Children line up behind you and ski along the route indicated in the diagram. The track is created therefore in the figure shown. The teacher can leave the track and transverse it, going in among the children, stopping them when necessary to issue new challenges.

TASKS	TEACHER SUGGESTIONS
8) Exploration of various locometer travels with poles. Repeat the above tasks with poles.	

Consolidation: Time should now be provided for children to explore, with poles on their own. Keep children on the track you have set up.

Evaluation of Lesson:

LESSON 3

Objective: Striding - striding explored without poles.

GRADE SIX

Overview: The term "diagonal stride" means simply travelling on skis using arms and legs the same as in walking. The learning of the stride is best facilitated initially by starting with ordinary walking on skis, then progressing to shuffling on skis, where a slide is used.

Equipment: Skis, poles and boots.

Skill Development:

TASKS

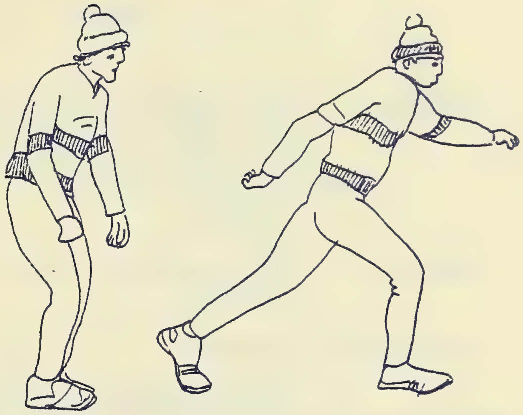
Five minutes exploratory travel on skis with poles.

1) Exploration of walking on skis without poles.
   - Can you walk on the track, swinging arms loosely, lifting skis slightly? (2 - 3 trips up and down track)
   - Can you shuffle ... that is add a slide? (2 - 3 trips)
   - Can you extend your arms forward and back? While walking?
2) Exploration of the diagonal stride without poles.
   - Can you extend the time you spend on the one ski?
   - Can you practise extending your free leg out behind you?
   - Try to "punch down" with the leg on which you are gliding! (2 or 3 travels)

TEACHER SUGGESTIONS

It is suggested that teachers adopt either Method 1 or 2 for organizing the class for instruction (see Lesson 2, page 103). It is important that children have a track on which to work.

The aim is an achievement of a fluid motion where the exchange of weight from one ski to the other occurs with proper timing.

TASKS	TEACHER SUGGESTIONS
- Travel along your track and count your number of strides. Repeat, now trying to reduce your number of glides by one each trip.	 When children come to the end of the track, they may turn around using, for now, any method they wish!

Consolidation: Ski hike - take your students along a trail in your school yard. This allows them opportunity to apply the skills practised today.

Evaluation:

LESSON 4

Objective: Striding - striding explored with poles.

GRADE

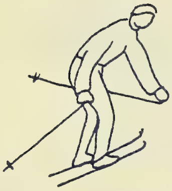
Overview: This lesson explores the basic strides using poles. It reviews the diagonal stride and introduces a parallel stride (referred to as double poling). Poles serve primarily to maintain rhythm and assist balance.

Equipment: Skis, poles and boots.

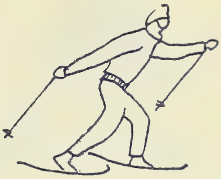
Introductory Activity:
Five minutes travelling on skis (with poles). Exploration and experimentation on the tracks.

Skill Development:

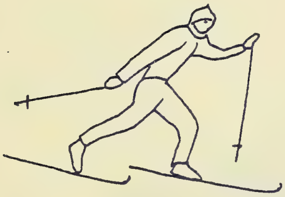
TASKS	TEACHER SUGGESTIONS
1) Exploration of diagonal stride while carrying poles.	Poles should be held halfway up the shaft.
- Can you stride on your skis, swinging arms loosely. (Keep baskets behind you and pointed down).	
- Repeat, concentrate on lengthening your stride and thrusting down hard on your kick.	
2) Exploration of diagonal stride using poles.	
- Practise your stride, using your poles. (2 or 3 trips)	
- Stay loose, and concentrate on a flowing, coordinated movement .... as with an exaggerated walk (2 or 3 trips).	
- Keep your arms fully extended (one forward and one back). Plant your basket near the boot toe of the lead ski. (2 or 3 trips)	



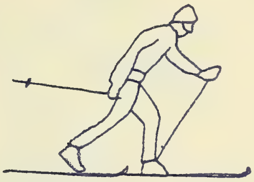
The right leg is even with the left, which is now weighted. With a slight, rapid sinking in its knee, the left leg starts its backward kick. The right arm has started its push just before the left leg's kick.



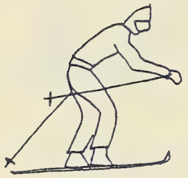
The left leg has almost completed its kick; when a gradual weight shift to the right leg starts. The right arm has finished its pole push. The left arm has almost completed its forward swing.



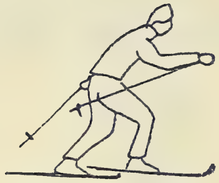
This is gliding: the right leg is now carrying all weight. The right arm has begun to swing forward, and the left pole is just being planted. Note the bend of the gliding knee and ankle.



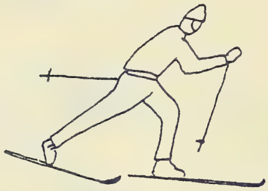
The left leg now swings forward; it is still unweighted. The right arm swings forward, while the left arm exerts downward force on its pole.



The left leg is even with the right, which now is weighted. This phase of the stride is just opposite to that of the first picture. The right leg starts its backward kick and the left arm has started its push.



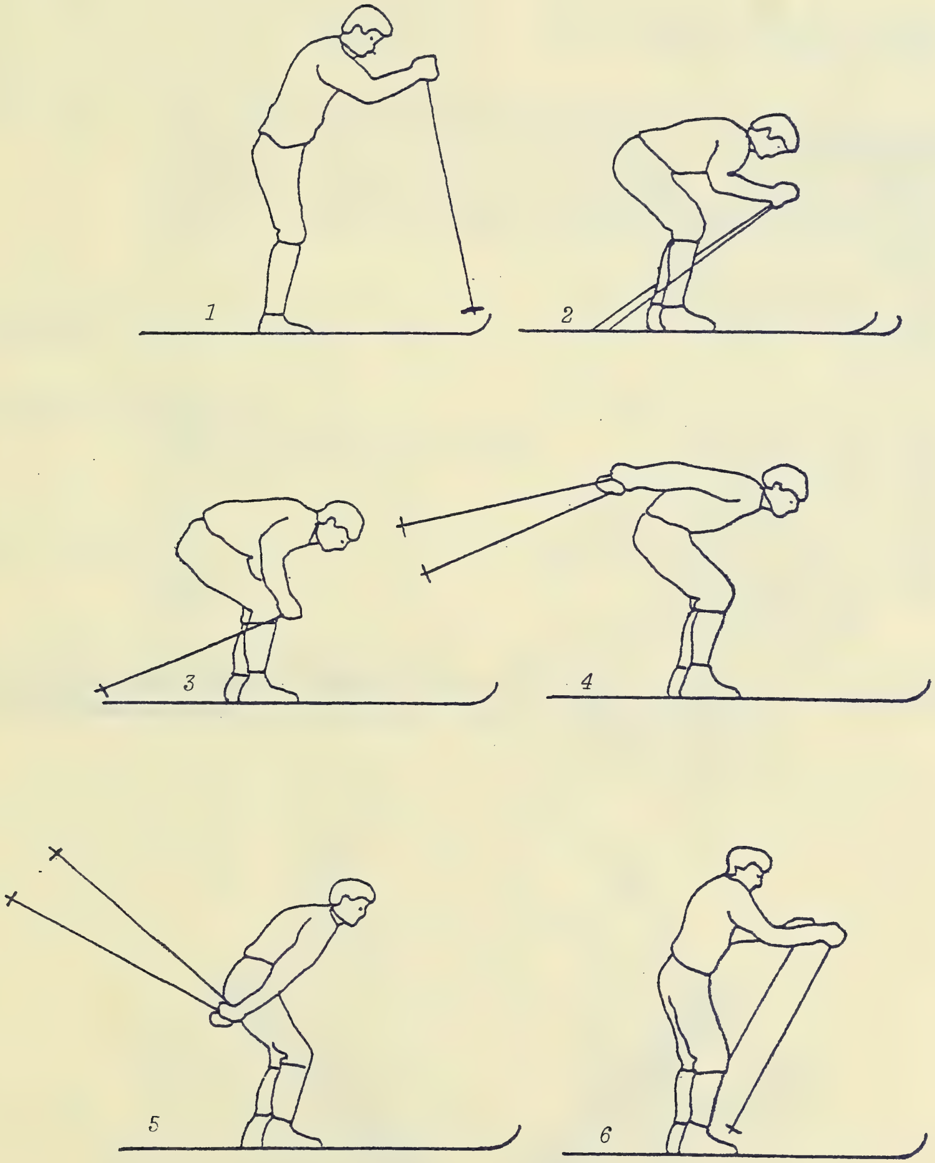
The right leg has almost completed its kick. This phase of the stride is opposite to that of the second picture. The left arm has almost completed its pole push. The right arm has almost come completely forward.



This is gliding on the left ski, just the opposite phase to the third picture. The left arm has begun to swing forward, and the right pole is just being planted.

TEACHER SUGGESTIONS (Cont'd)

DOUBLE POLING



Do not bend the head and shoulders too low during the maximum pushing phase (2) and (3).

TASKS	TEACHER SUGGESTIONS
3) Exploration of double poling.	
- Can you travel on your track while double poling?	

Double Poling

Double poling is a way of resting while running, as a change from the diagonal stride. Double poling is useful on slight declines to maintain speed, yet it allows the skier to relax.

Keeping the skis parallel, push with both poles simultaneously and glide, letting the poles trail behind you. Then plant the poles forward again and push as the skis glide past them.

Consolidation: School yard hike. Children should explore the school yard on skis, either in tour formation (one behind another) or independently.

LESSON 5

Objective: Turns and falls.

GRADE SIX

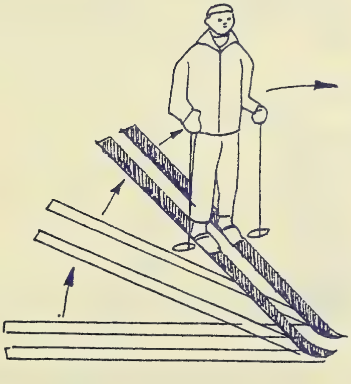
Overview: This lesson presents teaching suggestions and activities that enable children to become more mobile on skis (turns) and for children to learn how to fall and rise. There are numerous occasions in both "playground" and trail skiing where the mystery of these techniques is vital. Three turns will be explored.

Equipment: Skis, poles and boots.

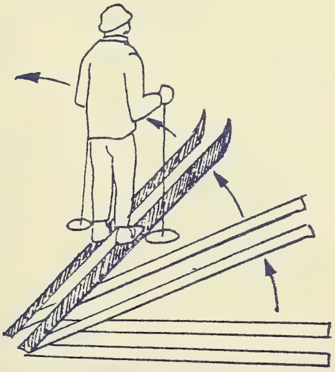
Introductory Activity:
Check wax conditions on skis.
Shadow activities.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Exploration of step turn moving the tails of the ski first. See diagram A.	Step-turns used on level or slightly inclined ground.



A

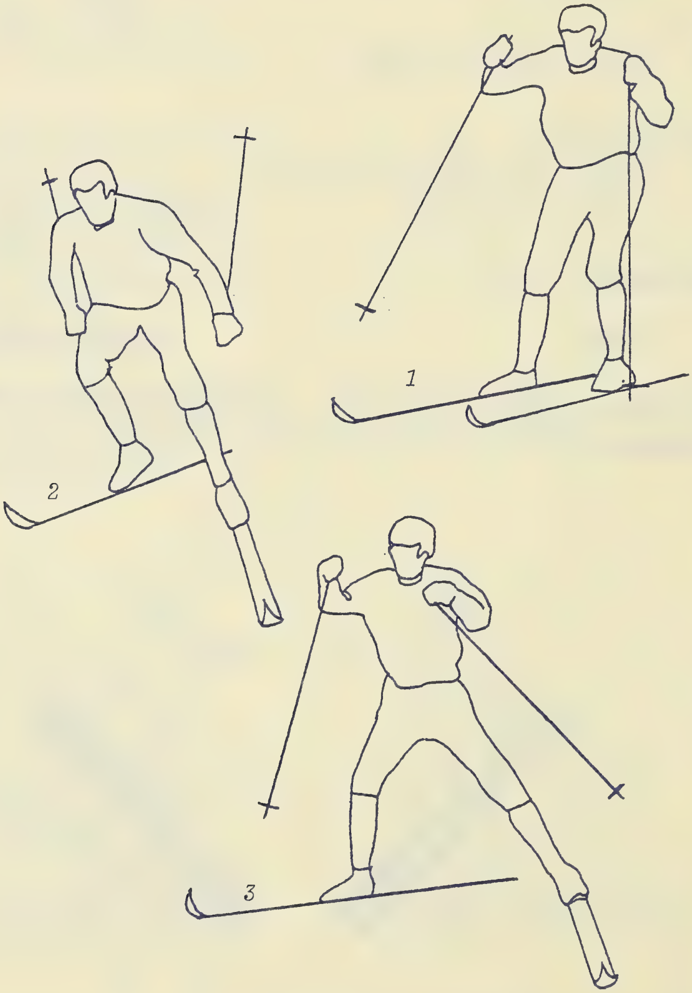


B

2) Exploration of step-turn moving tips first. See diagram B.

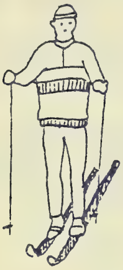
TASKS	TEACHER SUGGESTIONS
3) Exploration of step-around turn. Can you step around while in place? Can you slide ... and do the step around turn?	The step-around turn is simply moving alternate skis one at a time gradually changing directions. It is basically the step-turn done while sliding.

THE STEP-AROUND TURN

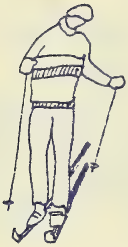


4) Exploration of kick-turns.

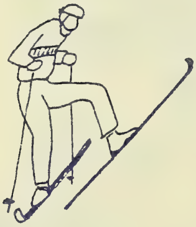
Can you perform the kick turn in both directions?



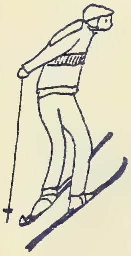
Skis are parallel and equally weighted, poles in front and unweighted.



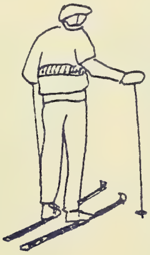
The "inside" pole is planted near the tail of the ski, weight remaining equally distributed on both poles for balance.



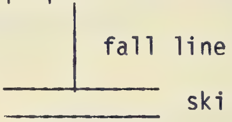
The inside ski is kicked up and forward. Pivoting the ski, the tip is brought down in the opposite direction.

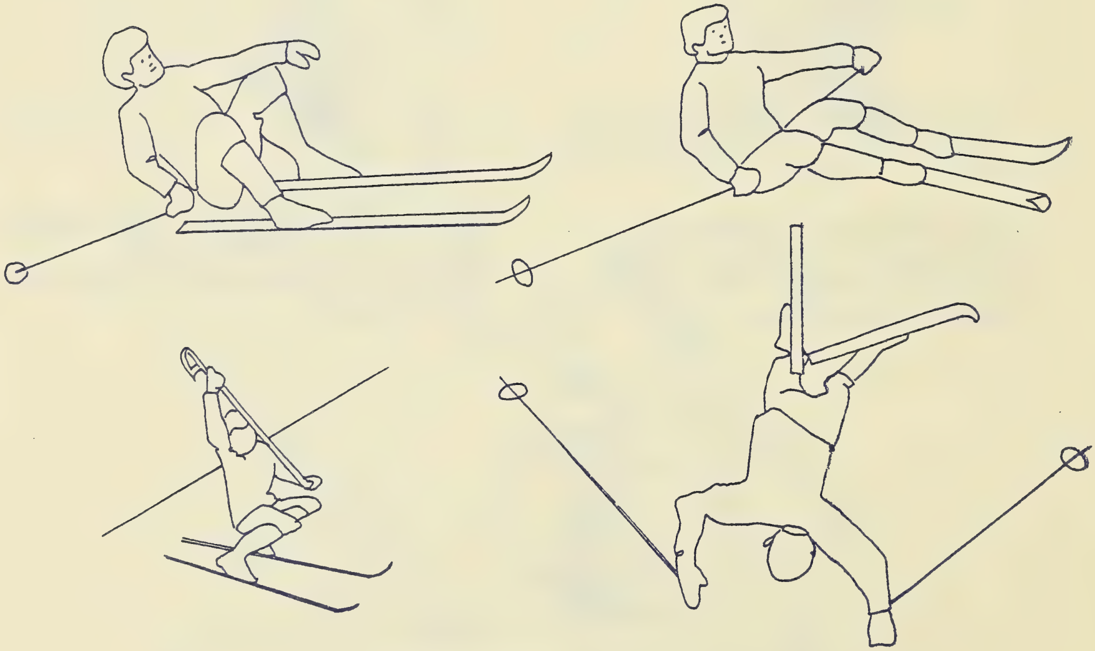


The inside ski is now flat on the snow in the new direction. Weight is transferred to this ski and its pole.



The outside ski and pole are now brought around. This position is now the same as the first but the direction is reversed.

TASKS	TEACHER SUGGESTIONS
5) Exploration of falls. In place, can you fall behind? To the left side? To the right side?	Three accepted ways of falling: - sitting down between one's skis - falling to one side - pitching forward onto one's face (not suggested here for practice)
Travel on your track and fall behind ... and to both sides? Can you fall and rise without poles? Can you fall and rise with poles?	Falling onto your side requires rolling backward, placing skis perpendicular to the fall line. 
Practise falling and getting up by rolling onto your back.	Then, the skier should move the center of gravity over the skis to rise. The poles should be used more for stability than for pushing one's self up. (see diagrams below)



Consolidation: School yard trek in pairs.

Evaluation of Lesson:

LESSON 6

Objective: Hills - exploration of travels up and down hills.

GRADE SIX

Overview: Cross-country skiing requires skills in both uphill and downhill skiing. This lesson is designed to explore three methods of travelling uphill, sidestepping, direct (traversing) and herringbone! It will explore three methods of skiing downhill: straight running, snow plowing, and turning.

The teaching methodology suggested follows the movement education philosophy used throughout the program. Initial work will be exploratory in nature. Teachers then set tasks that lead the children to develop skills in each of the six aspects covered in this lesson. They are:

1. Sidestepping uphill
2. Direct skiing uphill (traversing)
3. Herringbone uphill
4. Straight skiing downhill
5. Snowplowing downhill
6. Turning while skiing downhill.

Equipment: Skis, poles, boots, elevated ground.

Introductory Activity:
Exploration of hills. Set the task: Show ways of going up and coming down the hill.

Skill Development:

TASKS	TEACHER SUGGESTIONS
	The initial task (in the Introductory Activities) above gives children a chance to explore the hill and ways of negotiating it on their own.
1) Exploration of sidestepping uphill.	Proper spacing of the children is important.
Can you sidestep up the hill facing one direction? Then facing the other?	Children will have explored sidestepping, traversing, straight running and snowplowing in grades 3 and 4. A brief review might be sufficient here.
Can you take large steps? small steps?	

TASKS

How quickly can you sidestep up?

Can you hop while stepping up the hill?

Can you sidestep travel up at an angle?

(Children can ski down directly.)

2) Exploration of direct skiing uphill.

Can you ski directly up the hill?

Can you run on your skis up the hill?

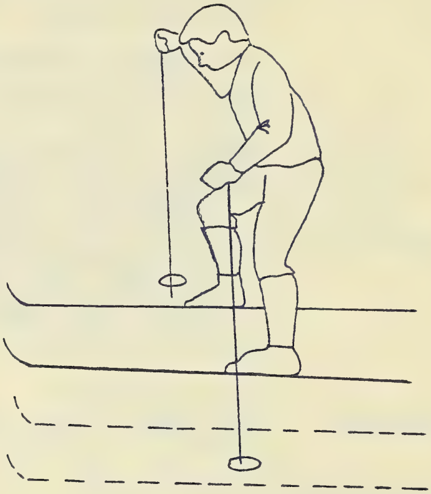
Can you take long strides up the hill?

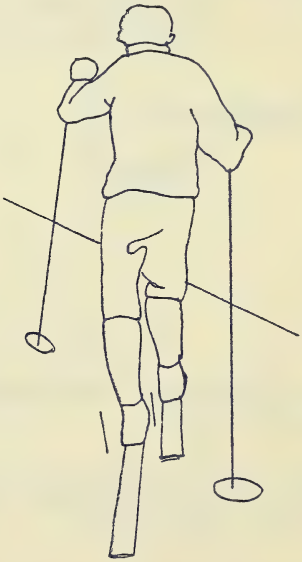
How might you reach a point on the hill over to your right? To your left?

Can you combine a sidestep with direct uphill climbing?

TEACHER SUGGESTIONS

The elevation used can increase as the children's skills improve. Initially, 2 - 3 metres is sufficient. A school yard provides enough rises and elevations to ensure challenging work.



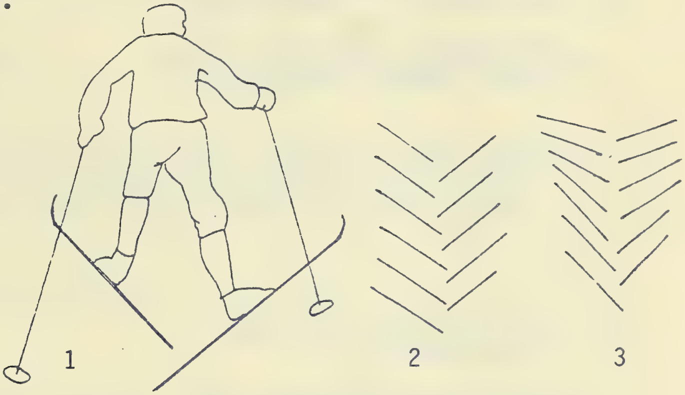


TASKS

TEACHER SUGGESTIONS

3) Exploration of herringbone.

Travel directly uphill. Gradually increase the distance between your ski tips.



1. Proper position.
2. Tracks left on uniform hill.
3. Tracks left on hill which gets steeper.

If children experience difficulties remaining erect when travelling downhill, a review of Lesson 2, page 105 (balances) on skis is suggested.

4) Exploration of straight running downhill.

Find a place on the hillside. Balance on one ski. Then the other ski.

Place one ski in front of the other - balance there.

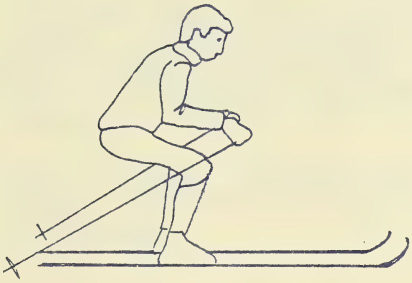
Crouch back - balance there.

Climb the hill, ski directly down. Place one ski in front of the other.

Can you get the other ski in front?

How low can you be when coming downhill?

Can you stop before reaching the bottom?

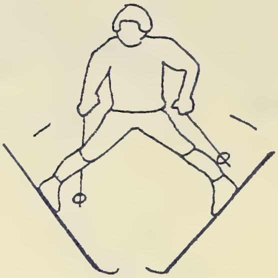


TASKS

TEACHER SUGGESTIONS

5) Exploration of snowplowing.

Ski downhill, move your tips closer together gradually.

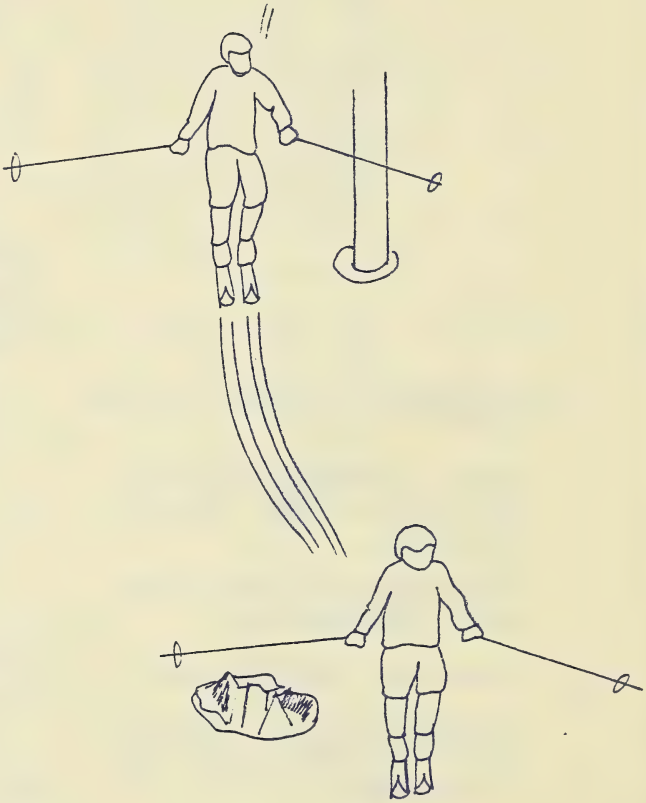


6) Exploration of turns when skiing downhill.

Can you ski down hill with most weight on one ski? The other?

Can you ski down hill and lift one ski to the left? To the right?

Repeat - take shorter steps and lean back on your heels.



Consolidation: Practise.

Evaluation of Lesson:

LESSON 7

Objective: Review of hill work. (see Lesson 6, page 119).

OUTDOOR PHYS-ED. GRADE SIX UNIT VII: CROSS-COUNTRY SKIING

Overview: Children have explored skiing while on hills. This lesson, an extension, of the work done in Lesson 6, is designed to provide challenges beyond those encountered last lesson.

Equipment: Skis, poles, boots, hill(s).

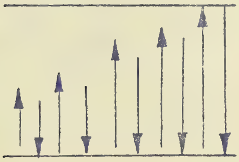
Introductory Activity:
Copying activities. In pairs, well spaced and one at a time, have children copy the travels up and down the hill of their partner.

Skill Development:

TASKS	TEACHER SUGGESTIONS
Review of techniques explored in Lesson 6.	This lesson is designed to afford the teacher opportunities to work with individual students. The teacher may issue the general task of: "Practise going up and down the hill using, at least once, each of the techniques practised last day". Then, by moving from student to student, the teacher can encourage and instruct.

Consolidation: a) Relay races.
In pairs, apart at a distance of 20 - 30 metres, have children count how many times they can change places in a specified time.

b) Lightning - children travel up to designated points, turn, and return to starting spot. Repeat, travel up to a point beyond the first. Return ... etc...



LESSON 8 & 9

Objective: Touring - schoolyard and beyond.

GRADE SIX

Overview: Opportunities to explore untried, and perhaps more difficult terrain, is a worthwhile application of the skills learned previously. Parks, canyons, or trails along a river can be used.

Equipment: Skis, poles, boots and teacher supplies (see teaching suggestions).

Introductory Activity:
Preparation for trip, discussion of proper clothing, behaviour and of procedures while on the tour.

Skill Development:

TASKS	TEACHER SUGGESTIONS
1) Assemble children at the location. Assign children to adult leaders. Set off on the trail.	It is strongly recommended that teachers follow the suggestions listed below in their organization and carrying out of the tour. 1. Get adult assistance. A ratio of 8 children to 1 adult is desired. Parents, or members of local ski clubs may assist. 2. Prepare children by reviewing principles of proper dress for winter activities (see lesson page 104). 3. Teachers should review general first aid procedures. They should carry a soft pack (backpack) in which the following items need to be included: - matches (in plastic bag) - jacknife - nylon cord or string (2 meters) - ski tip replacement (if wood skis are used) - cans of green and blue wax, scraper and cork

Evaluation of Lesson:

LESSON 10

Objective: Orienteering

GRADE SIX

Overview: A challenging application of skills learned in the cross-country skiing unit is through orienteering. Simply, score orienteering is the following of written clues to designated places. Here, a marking or letter is placed, and children record that letter on a personal score card. Maps can be used, but are not necessary.

Equipment: Skis, poles, boots, map (optional) and score card.

Introductory Activity:

1) Teacher marks check points out in the schoolyard, park, etc. The mark used at each checkpoint can be letters (A, B, C, etc.) or geometric figures (0, △, □, ▯. etc.)

2) The marks are recorded on a master sheet. Students receive a word description sheet and/or a map (see teaching suggestions, page 126).

3) Students are to read their word description sheet, set off at the same time, and locate as many of the checkpoints as possible within your designated time limit.

4) Students record on their chart, the letter or marking found at the points.

Skill Development:

TASKS — TEACHER SUGGESTIONS

Set out, return at a given signal.

No.	Description of Landmark (Checkpt.)	Value	Insert Code Letter
1	On the east end of softball backstop	15	T
2	On the north side of flower garden	10	B
3	On the south goalpost of field B	5	C
4	On the northwest side of an old stump	10	F
5	At the northeast end of the softball stands	15	R
6	On the bench near three pine trees	15	U
7	On the southwest side of field A	10	A
8	On the west corner of statue	25	Y
	Total points	______	
	Penalty points	______	
	Final score	______	

Consolidation: Total points amassed.

Evaluation of Lesson:

GLOSSARY

ALPINE SKIING - Downhill and slalom recreational or racing skiing versus Nordic or cross country.

ANKLETS - Ankle-high gaiters.

ANORAK - A lightweight parka usually with a hood, worn over sweaters or down parkas for wind protection.

BACKSLIP - The kicking foot slides backwards in the diagonal stride due to improper waxing or improper flex in the ski.

BAIL - A clamping device which fits around the boot upper and presses down the sole over the pins of the normal pin binding.

BALACLAVA - A woolen cap covering the whole head to the top of the shoulders.

BASE - A pine tar or pine-tar derivative coating, burned on to the bottoms of wooden skis before waxing.

BASE WAX - The first wax that is applied under the surface wax on the base to improve adhesion.

BASKET - The ring at the end of the ski pole

BIATHLON - A 20-kilometer cross country race, combined with target shooting.

BINDER WAX - See Base Wax.

BINDING - The fastening mechanism between the ski boot and the ski, originally the "harness".

CABLE BINDING - A toe and heel strap binding that enables the skier to get a tight fit on the heel strap.

CAMBER - The bend built into skis to make the pressure on the snow more uniform.

COMBINED - A cross country event combining a 15 kilometer cross country race and a 60 meter jumping competition.

DIAGONAL STRIDE - The transferral of weight from one ski to another in a smooth, rhythmical stride. It is the basis for all cross country technique.

DOWNHILL - See Alpine Skiing.

DOUBLE POLING - Swinging both arms forward at the beginning of a stride; planting both poles simultaneously; leaning forward; drawing both feet together in a glide.

DUBBIN - Boot grease for waterproofing ski boots.

EDGING - The action of angling skis into the hill to prevent them from slipping sideways, or, to make a turn.

FALL LINE - The shortest distance to the bottom of the hill.

FJELL SKI - See Mountain Ski

GAITERS - Coverings for the lower part of the leg which fasten over the boot and prevent snow or wet slush from penetrating around the socks.

GESCHMOSSEL START - The start of a tour race where all skiers begin simultaneously.

GLIDE - The slide which the skier gets on his forward ski during each stride.

GLISSADE - A speed-checking maneuver -- sliding on one's feet and using a pole or poles for a brake.

GROOVE - The depression on the undersurface of the ski that makes it go straignt.

GRUNDVALLA - A pine tar derivative that is burned into the undersurface of the ski to form a good base.

GRUNDVOX - A base wax that waterproofs the base and improves the bond of surface waxes.

HEEL - The tail of the ski.

HERRINGBONE - The most tiring way to climb -- the skier's body is at the base of a V, which is formed by the skis.

HICKORY - The wood from which most cross country skis are made.

HOTING SKI - The oldest known ski, found in a peat bog in Sweden and thought to be 4500 years old.

KANDAHAR BINDING - A cable binding with a shortening clamp in front of the toe. This binding is an excellent choice for children.

KICK - The push action of the rear leg when all one's weight is being transferred to the gliding ski.

KLISTERS - Soft waxes applied with a small wooden applicator.

LIGNOSTONE - A compressed beechwood material, impregnated with phenol and used for making the edges of hickory ski bottoms.

MOUNTAIN SKI - A heavy touring ski equipped with steel edges.

NORDIC SKIING - Cross country racing and jumping events; cross country skiing as opposed to downhill skiing

ORIENTEERING - A sport that combines map and compass reading with either skiing or running.

PIN BINDING - A toe-only type, with pins or studs which project into holes in the sole of the boot.

POLE PLANT - The action of sticking the poles into the snow.

POP-UP - A small rubber or spring metal mechanism that is fastened to the top of the ski and under the heel of the boot to prevent ice and snow from building up.

RACING SKIS - Very narrow (2 inches) and very light (less than 3 1/2 lbs) skis.

RELAY - A team race. One skier skis at a time, tagging another team member. Exactly like relay running.

ROTTEFELLA BINDING - The original pin binding.

SHELL - A lightweight parka

SHORTENING CLAMP - A hinge in the cable binding which clamps the cable tight by shortening its length. Used in the tempo and kandahar bindings.

SIDE CAMBER - The taper of the ski when seen from above. The ski is wider in front than at the back, which results in the back tracking in a straight line behind the tip.

SIDESTEPPING A procedure for climbing hills. The skier transfers his weight from one ski to the other, reaching as high with the uphill ski as he can.

SKATING - An extremely efficient way of maintaining speed on slight downgrades or on flats when there is a tailwind.

SLIDER-SKIS - Very short, plastic play skis for children.

SLING - A carrier for very small babies

SLIP-PASS - The action whereby the trailing ski in the telemark turn slips behind the boot of the forward ski. The skier's legs cross and he usually falls.

SNOW PLOW - A technique on cross country skis to control speed and packed snow conditions, where the tips of both skis almost meet.

SNOWSEAL - A dubbin compound rubbed into leather boots to keep them soft and pliable.

SOLE - The bottom of the ski.

STEM TURN - A turn often used in downhill skiing whereby weight is transferred from one ski to the other and the weightless ski is lifted slightly off the ground at an angle to the other ski.

STEP TURN - Direction is gradually changed by moving one ski at a time.

STRIDE - A sliding pace.

TAIL - The very back of the ski; also called the "heel".

TELEMARK POSITION - One ski is moved far forward forming a right angle with the knee of the forward leg.

TELEMARK TURN - While in the telemark position, the forward ski is steered in the desired direction and is edged as necessary.

TEMPO BINDING - A cable binding with a shortening clamp on the side of the heel.

TIP - The very front of the ski.

TOE IRON - The clamp mounted on the ski to hold the toe of the boot.

TONKIN CANE - A Chinese bamboo used for making ski poles.

TOQUE - A small stretchable cap.

TOURING SKIS - Wider than the racing type (70 mm or more) and heavier (up to 7 lbs per pair).

TRACK - The trail left by skis in soft snow, or, a prepared racing trail.

TRAVERSING Crossing a slope diagonally.

TRACK - The call made by a skier when he wants the skier ahead of him to step aside and let him pass.

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